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AN

INQUIRY

INTO

THE CAUSES AND EFFECTS

OF THE

VARIOLÆ VACCINÆ,

A DISEASE

DISCOVERED IN SOME OF THE WESTERN COUNTIES OF ENGLAND,

PARTICULARLY

GLOUCESTERSHIRE,

AND KNOWN BY THE NAME OF

THE COW POX.

By EDWARD JENNER, M.D. F.R.S. &c.

——— QUID NOBIS CERTIUS IPSIS
SENSIBUS ESSE POTEST, QUO VERA AC FALSA NOTEMUS.

LUCRETIUS.

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1801.

TO THE KING.

SIR,

WHEN I firſt addreſſed the Public on a Phyſiological ſubject, which I conceived to be of the utmoſt importance to the future welfare of the human race, I could not preſume, in that early ſtage of the inveſtigation,

to

to lay the result of my Inquiries at your Majesty's feet.

Subsequent experiments, instituted not only by myself, but by men of the first rank in the medical profession, have now confirmed the truth of the theory which I first made known to the world.

Highly honoured by the permission to dedicate the result of my Inquiries to your Majesty, I am emboldened to solicit your gracious patronage of a discovery which reason fully authorizes me to suppose will prove peculiarly conducive to the preservation of the lives of mankind.

To

To a Monarch no leſs juſtly than emphatically ſtyled the Father of his People, this Treatiſe is inſcribed with perfect propriety; for, conſpicuous as your Majeſty's patronage has been of Arts, of Sciences, and of Commerce, yet the moſt diſtinguiſhed feature of your character is your paternal care for the dearer intereſts of humanity.

I am,

SIR,

With the moſt profound reſpect,

Your Majeſty's moſt devoted

Subject and Servant,

EDWARD JENNER.

Berkeley, Glouceſterſhire,
Dec. 20, 1799.

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AN

INQUIRY,

&c. &c.

THE deviation of Man from the ſtate in which he was originally placed by Nature, ſeems to have proved to him a prolific ſource of Diſeaſes. From the love of ſplendour, from the indulgences of luxury, and from his fondneſs for amuſement, he has familiariſed himſelf with a great number of animals, which may not originally have been intended for his aſſociates.

The

The Wolf, diſarmed of ferocity, is now pillowed in the lady's lap*. The Cat, the little Tyger of our iſland, whoſe natural home is the foreſt, is equally domeſticated and careſſed. The Cow, the Hog, the Sheep, and the Horſe, are all, for a variety of purpoſes, brought under his care and dominion.

There is a diſeaſe to which the Horſe, from his ſtate of domeſtication, is frequently ſubject. The Farriers have termed it *the Greaſe*. It is an inflammation and ſwelling in the heel, accompanied at its commencement with ſmall cracks or fiſſures, from which iſſues a limpid fluid, poſſeſſing properties of a very peculiar kind. This fluid ſeems capable of generating a diſeaſe in the human body (after it has undergone the modification I ſhall

* The late Mr. John Hunter proved, by experiments, that the Dog is the Wolf in a degenerated ſtate

preſently

preſently ſpeak of), which bears ſo ſtrong a reſemblance to the Small Pox, that I think it highly probable it may be the ſource of that diſeaſe.

In this Dairy Country a great number of Cows are kept, and the office of milking is performed indiſcriminately by Men and Maid Servants. One of the former having been appointed to apply dreſſings to the heels of a Horſe affected with the malady I have mentioned, and not paying due attention to cleanlineſs, incautiouſly bears his part in milking the Cows, with ſome particles of the infectious matter adhering to his fingers. When this is the caſe, it frequently happens that a diſeaſe is communicated to the Cows, and from the Cows to the Dairy-maids, which ſpreads through the farm until moſt of the cattle and domeſtics feel its unpleaſant conſequences. This diſeaſe has obtained the name of the *Cow Pox*. It appears on

the nipples of the Cows in the form of irregular puſtules. At their firſt appearance they are commonly of a paliſh blue, or rather of a colour ſomewhat approaching to livid, and are ſurrounded by an inflammation. Theſe puſtules, unleſs a timely remedy be applied, frequently degenerate into phagedenic ulcers, which prove extremely troubleſome*. The animals become indiſpoſed, and the ſecretion of milk is much leſſened. Inflamed ſpots now begin to appear on different parts of the hands of the domeſtics employed in milking, and ſometimes on the wriſts, which run on to ſuppuration, firſt aſſuming the appearance of the ſmall veſications produced by a burn. Moſt commonly they appear about the joints of the fingers, and at their extremities; but whatever parts

* They who attend ſick cattle in this country find a ſpeedy remedy for ſtopping the progreſs of this complaint in thoſe applications which act chemically upon the morbid matter, ſuch as the ſolutions of the Vitriolum Zinci, the Vitriolum Cupri, &c.

are

are affected, if the ſituation will admit, theſe ſuperficial ſuppurations put on a circular form, with their edges more elevated than their centre, and of a colour diſtantly approaching to blue. Abſorption takes place, and tumours appear in each axilla. The ſyſtem becomes affected, the pulſe is quickened; ſhiverings, ſucceeded by heat, general laſſitude and pains about the loins and limbs, with vomiting, come on. The head is painful, and the patient is now and then even affected with delirium*. Theſe ſymptoms, varying in their degrees of violence, generally continue from one day to three or four, leaving ulcerated ſores about the hands, which, from the ſenſibility of the parts, are very troubleſome, and commonly heal ſlowly, frequently becoming phagedenic, like thoſe from

* It will appear in the ſequel that theſe ſymptoms ariſe principally from the irritation of the ſores, and not from the primary action of the vaccine virus upon the Conſtitution.

whence

whence they ſprung. During the progreſs of the diſeaſe, the lips, noſtrils, eyelids, and other parts of the body, are ſometimes affected with ſores; but theſe evidently ariſe from their being heedleſsly rubbed or ſcratched with the patient's infected fingers. No eruptions on the ſkin have followed the decline of the feveriſh ſymptoms in any inſtance that has come under my inſpection, one only excepted, and in this caſe a very few appeared on the arms: they were very minute, of a vivid red colour, and ſoon died away without advancing to maturation; ſo that I cannot determine whether they had any connection with the preceding ſymptoms.

Thus the diſeaſe makes its progreſs from the Horſe (as I conceive) to the nipple of the Cow, and from the Cow to the Human Subject.

Morbid matter of various kinds, when abſorbed

into the ſyſtem, may produce effects in ſome degree ſimilar; but what renders the Cow Pox virus ſo extremely ſingular is, that the perſon who has been thus affected is for ever after ſecure from the infection of the Small Pox; neither expoſure to the variolous effluvia, nor the inſertion of the matter into the ſkin, producing this diſtemper.

In ſupport of ſo extraordinary a fact, I ſhall lay before my Reader a great number of inſtances: but firſt it is neceſſary to obſerve, that puſtulous ſores frequently appear ſpontaneouſly on the nipples of the Cows, and inſtances have occurred, though very rarely, of the hands of the ſervants employed in milking being affected with ſores in conſequence, and even of their feeling an indiſpoſition from abſorption. Theſe puſtules are of a much milder nature than thoſe which ariſe from that contagion which conſtitutes the

true

true Cow Pox. They are always free from the bluiſh or livid tint ſo conſpicuous in the puſtules in that diſeaſe. No eryſipelas attends them, nor do they ſhew any phagedenic diſpoſition, as in the other caſe, but quickly terminate in a ſcab without creating any apparent diſorder in the Cow. This complaint appears at various ſeaſons of the year, but moſt commonly in the ſpring, when the Cows are firſt taken from their winter food and fed with graſs. It is very apt to appear alſo when they are ſuckling their young. But this diſeaſe is not to be conſidered as ſimilar in any reſpect to that of which I am treating, as it is incapable of producing any ſpecific effects on the human Conſtitution. However, it is of the greateſt conſequence to point it out here, leſt the want of diſcrimination ſhould occaſion an idea of ſecurity from the infection of the Small Pox, which might prove deluſive.

CASE

CASE I.

JOSEPH MERRET, now an Under Gardener to the Earl of Berkeley, lived as a Servant with a Farmer near this place in the year 1770, and occaſionally aſſiſted in milking his maſter's cows. Several horſes belonging to the farm began to have ſore heels, which Merret frequently attended. The cows ſoon became affected with the Cow Pox, and ſoon after ſeveral ſores appeared on his hands. Swellings and ſtiffneſs in each axilla followed, and he was ſo much indiſpoſed for ſeveral days as to be incapable of purſuing his ordinary employment. Previouſly to the appearance of the diſtemper among the cows there was no freſh cow brought into the farm, nor any ſervant employed who was affected with the Cow Pox.

In April, 1795, a general inoculation taking place here, Merret was inoculated with his family; ſo that a period of twenty-five years had elapſed from his having the Cow Pox to this time. However, though the variolous matter was re-

peatedly inſerted into his arm, I found it impracticable to infect him with it; an efflorescence only, taking on an eryſipelatous look about the centre, appearing on the ſkin near the punctured parts. During the whole time that his family had the Small Pox, one of whom had it very full, he remained in the houſe with them, but received no injury from expoſure to the contagion.

It is neceſſary to obſerve, that the utmoſt care was taken to aſcertain, with the moſt ſcrupulous preciſion, that no one whoſe caſe is here adduced had gone through the Small Pox previous to theſe attempts to produce that diſeaſe.

Had theſe experiments been conducted in a large city, or in a populous neighbourhood, ſome doubts might have been entertained; but here, where population is thin, and where ſuch an event as a perſon's having had the Small Pox is always faithfully recorded, no riſk of inaccuracy in this particular can ariſe.

CASE II.

SARAH PORTLOCK, of this place, was infected with the Cow Pox, when a Servant at a Farmer's in the neighbourhood, twenty-ſeven years ago *.

In the year 1792, conceiving herſelf, from this circumſtance, ſecure from the infection of the Small Pox, ſhe nurſed one of her own children who had accidentally caught the diſeaſe, but no indiſpoſition enſued.—During the time ſhe remained in the infected room, variolous matter was inſerted into both her arms, but without any further effect than in the preceding caſe.

* I have purpoſely ſelected ſeveral caſes in which the diſeaſe had appeared at a very diſtant period previous to the experiments made with variolous matter, to ſhew that the change produced in the conſtitution is not affected by time.

CASE III.

JOHN PHILLIPS, a Tradeſman of this town, had the Cow Pox at ſo early a period as nine years of age. At the age of ſixty-two I inoculated him, and was very careful in ſelecting matter in its moſt active ſtate. It was taken from the arm of a boy juſt before the commencement of the eruptive fever, and inſtantly inſerted. It very ſpeedily produced a ſting-like feel in the part. An efflorescence appeared, which on the fourth day was rather extenſive, and ſome degree of pain and ſtiffneſs were felt about the ſhoulder; but on the fifth day theſe ſymptoms began to diſappear, and in a day or two after went entirely off, without producing any effect on the ſyſtem.

CASE IV.

MARY BARGE, of Woodford, in this pariſh, was inoculated with variolous matter in the year 1791. An efflorescence of

of a paliſh red colour ſoon appeared about the parts where the matter was inſerted, and ſpread itſelf rather extenſively, but died away in a few days without producing any variolous ſymptoms *. She has ſince been repeatedly employed as a nurſe to Small-pox patients, without experiencing any ill conſequences. This woman had the Cow Pox when ſhe lived in the ſervice of a Farmer in this pariſh thirty-one years before.

CASE V.

MRS. H——, a reſpectable Gentlewoman of this town, had the Cow Pox when very young. She received the in-

* It is remarkable that variolous matter, when the ſyſtem is diſpoſed to reject it, ſhould excite inflammation on the part to which it is applied more ſpeedily than when it produces the Small Pox. Indeed it becomes almoſt a criterion by which we can determine whether the infection will be received or not. It ſeems as if a change, which endures through life, had been produced in the action, or diſpoſition to action, in the veſſels of the ſkin; and it is remarkable too, that whether this change has been effected by the Small Pox, or the Cow Pox, that the diſpoſition to ſudden cuticular inflammation is the ſame on the application of variolous matter.

fectioni n a manner that is not common: it was given by means of her handling ſome of the ſame utenſils* which were in uſe among the ſervants of the family, who had the diſeaſe from milking infected cows. Her hands had many of the Cow-pox ſores upon them, and they were communicated to her noſe, which became inflamed and very much ſwoln. Soon after this event Mrs. H—— was expoſed to the contagion of the Small Pox, where it was ſcarcely poſſible for her to have eſcaped, had ſhe been ſuſceptible of it, as ſhe regularly attended a relative who had the diſeaſe in ſo violent a degree that it proved fatal to him.

In the year 1778 the Small Pox prevailed very much at Berkeley, and Mrs. H—— not feeling perfectly ſatisfied reſpecting her ſafety (no indiſpoſition having followed her expoſure to the Small Pox) I inoculated her with active variolous matter. The ſame appearance followed as in the preceding

* When the Cow Pox has prevailed in the dairy, it has often been communicated to thoſe who have not milked the cows, by the handle of the milk pail.

caſes—

caſes—an effloreſcence on the arm without any effect on the conſtitution.

CASE VI.

IT is a fact ſo well known among our Dairy Farmers, that thoſe who have had the Small Pox either eſcape the Cow Pox or are diſpoſed to have it ſlightly; that as ſoon as the complaint ſhews itſelf among the cattle, aſſiſtants are procured, if poſſible, who are thus rendered leſs ſuſceptible of it, otherwiſe the buſineſs of the farm could ſcarcely go forward.

In the month of May, 1796, the Cow Pox broke out at Mr. Baker's, a Farmer who lives near this place. The diſeaſe was communicated by means of a cow which was purchaſed in an infected ſtate at a neighbouring fair, and not one of the Farmer's cows (conſiſting of thirty) which were at that time milked eſcaped the contagion. The family conſiſted of a man ſervant, two dairymaids, and a ſervant boy, who, with the Farmer himſelf, were twice a day employed in milking the cattle.

cattle. The whole of this family, except Sarah Wynne, one of the dairymaids, had gone through the Small Pox. The conſequence was, that the Farmer and the ſervant boy eſcaped the infection of the Cow Pox entirely, and the ſervant man and one of the maid ſervants had each of them nothing more than a ſore on one of their fingers, which produced no diſorder in the ſyſtem. But the other dairymaid, Sarah Wynne, who never had the Small Pox, did not eſcape in ſo eaſy a manner. She caught the complaint from the cows, and was affected with the ſymptoms deſcribed in the 5th page in ſo violent a degree, that ſhe was confined to her bed, and rendered incapable for ſeveral days of purſuing her ordinary vocations in the farm.

March 28th, 1797, I inoculated this girl, and carefully rubbed the variolous matter into two ſlight inciſions made upon the left arm. A little inflammation appeared in the uſual manner around the parts where the matter was inſerted, but ſo early as the fifth day it vaniſhed entirely without producing any effect on the ſyſtem.

CASE

CASE VII.

ALTHOUGH the preceeing hiſtory pretty clearly evinces that the conſtitution is far leſs ſuſceptible of the contagion of the Cow Pox after it has felt that of the Small Pox, and although in general, as I have obſerved, they who have had the Small Pox, and are employed in milking cows which are infected with the Cow Pox, either eſcape the diſorder, or have ſores on the hands without feeling any general indiſpoſition, yet the animal economy is ſubject to ſome variation in this reſpect, which the following relation will point out:

In the ſummer of the year 1796 the Cow Pox appeared at the Farm of Mr. Andrews, a conſiderable dairy adjoining to the town of Berkeley. It was communicated, as in the preceding inſtance, by an infected cow purchaſed at a fair in the neighbourhood. The family conſiſted of the Farmer, his wife, two ſons, a man and a maid ſervant; all of whom, except the

Farmer (who was fearful of the conſequences) bore a part in milking the cows. The whole of them, excluſive of the man ſervant, had regularly gone through the Small Pox; but in this caſe no one who milked the cows eſcaped the contagion. All of them had ſores upon their hands, and ſome degree of general indiſpoſition, preceded by pains and tumours in the axillæ: but there was no compariſon in the ſeverity of the diſeaſe as it was felt by the ſervant man, who had eſcaped the Small Pox, and by thoſe of the family who had not; for, while he was confined to his bed, they were able, without much inconvenience, to follow their ordinary buſineſs.

February the 13th, 1797, I availed myſelf of an opportunity of inoculating William Rodway, the ſervant man above alluded to. Variolous matter was inſerted into both his arms; in the right by means of ſuperficial inciſions, and into the left by ſlight punctures into the cutis. Both were perceptibly inflamed on the third day. After this the inflammation about the punctures ſoon died away, but a ſmall appearance of eryſipelas was manifeſt about the edges of the inciſions till the eighth day, when

when a little uneaſineſs was felt for the ſpace of half an hour in the right axilla. The inflammation then haſtily diſappeared without producing the moſt diſtant mark of affection of the ſyſtem.

CASE VIII.

ELIZABETH WYNNE, aged fifty-ſeven, lived as a ſervant with a neighbouring Farmer thirty-eight years ago. She was then a dairymaid, and the Cow Pox broke out among the cows. She caught the diſeaſe with the reſt of the family, but, compared with them, had it in a very ſlight degree, one very ſmall ſore only breaking out on the little finger of her left hand, and ſcarcely any perceptible indiſpoſition following it.

As the malady had ſhewn itſelf in ſo ſlight a manner, and as it had taken place at ſo diſtant a period of her life, I was happy with the opportunity of trying the effects of variolous matter upon her conſtitution, and on the 28th of March, 1797, I

 inoculated

inoculated her by making two ſuperficial inciſions on the left arm, on which the matter was cautiouſly rubbed. A little efflóreſcence ſoon appeared, and a tingling ſenſation was felt about the parts where the matter was inſerted until the third day, when both began to ſubſide, and ſo early as the fifth day it was evident that no indiſpoſition would follow.

CASE IX.

ALTHOUGH the Cow Pox ſhields the conſtitution from the Small Pox, and the Small Pox proves a protection againſt its own future poiſon, yet it appears that the human body is again and again ſuſceptible of the infectious matter of the Cow Pox, as the following hiſtory will demonſtrate:

William Smith, of Pyrton in this pariſh, contracted this diſeaſe when he lived with a neighbouring Farmer in the year 1780. One of the horſes belonging to the farm had ſore heels, and it fell to his lot to attend him. By theſe means the infection

infection was carried to the cows, and from the cows it was communicated to Smith. On one of his hands were ſeveral ulcerated ſores, and he was affected with ſuch ſymptoms as have been before deſcribed.

In the year 1791 the Cow Pox broke out at another farm where he then lived as a ſervant, and he became affected with it a ſecond time; and in the year 1794 he was ſo unfortunate as to catch it again. The diſeaſe was equally as ſevere the ſecond and third time as it was on the firſt *.

In the ſpring of the year 1795 he was twice inoculated, but no affection of the ſyſtem could be produced from the variolous matter; and he has ſince aſſociated with thoſe who had the Small Pox in its moſt contagious ſtate without feeling any effect from it.

* This is not the caſe in general—a ſecond attack is commonly very ſlight, and ſo, I am informed, it is among the cows. The reader will find further obſervations on this ſubject in the ſequel. Theſe repeated indiſpoſitions muſt have ariſen from the local irritation, and not from the ſpecific action of the vaccine virus.

CASE X.

SIMON NICHOLS lived as a ſervant with Mr. Bromedge, a gentleman who reſides on his own farm in this pariſh, in the year 1782. He was employed in applying dreſſings to the ſore heels of one of his maſter's horſes, and at the ſame time aſſiſted in milking the cows. The cows became affected in conſequence, but the diſeaſe did not ſhew itſelf on their nipples till ſeveral weeks after he had begun to dreſs the horſe. He quitted Mr. Bromedge's ſervice, and went to another farm without any ſores upon him; but here his hands ſoon began to be affected in the common way, and he was much indiſpoſed with the uſual ſymptoms. Concealing the nature of the malady from Mr. Cole, his new maſter, and being there alſo employed in milking, the Cow Pox was communicated to the cows.

Some years afterwards Nichols was employed in a farm where the Small Pox broke out, when I inoculated him with ſeveral other

other patients, with whom he continued during the whole time of their confinement. His arm inflamed, but neither the inflammation nor his aſſociating with the inoculated family produced the leaſt effect upon his conſtitution.

CASE XI.

WILLIAM STINCHCOMB was a fellow ſervant with Nichols at Mr. Bromedge's Farm at the time the cattle had the Cow Pox, and he was unfortunately infected by them. His left hand was very ſeverely affected with ſeveral corroding ulcers, and a tumour of conſiderable ſize appeared in the axilla of that ſide. His right hand had only one ſmall ſore upon it, and no tumour diſcovered itſelf in the correſponding axilla.

In the year 1792 Stinchcomb was inoculated with variolous matter, but no conſequences enſued beyond a little inflammation in the arm for a few days. A large party were inoculated at the ſame time, ſome of whom had the diſeaſe in a more violent degree

degree than is commonly ſeen from inoculation. He purpoſely aſſociated with them, but could not receive the Small Pox.

During the ſickening of ſome of his companions, their ſymptoms ſo ſtrongly recalled to his mind his own ſtate when ſickening with the Cow Pox, that he very pertinently remarked their ſtriking ſimilarity.

CASE XII.

THE Paupers of the village of Tortworth, in this County, were inoculated by Mr. Henry Jenner, Surgeon, of Berkeley, in the year 1795. Among them, eight patients preſented themſelves who had at different periods of their lives had the Cow Pox. One of them, Heſter Walkley, I attended with that diſeaſe when ſhe lived in the ſervice of a Farmer in the ſame village in the year 1782; but neither this woman, nor any other of the patients who had gone through the Cow Pox, received the variolous infection either from the arm or from mixing

mixing in the ſociety of the other patients who were inoculated at the ſame time. This ſtate of ſecurity proved a fortunate circumſtance, as many of the poor women were at the ſame time in a ſtate of pregnancy.

CASE XIII.

ONE inſtance has occurred to me of the ſyſtem being affected from the matter iſſuing from the heels of horſes, and of its remaining afterwards unſuſceptible of the variolous contagion; another, where the Small Pox appeared obſcurely; and a third, in which its complete exiſtence was poſitively aſcertained.

Firſt, THOMAS PEARCE, is the ſon of a Smith and Farrier near to this place. He never had the Cow Pox; but, in conſequence of dreſſing horſes with ſore heels at his father's, when a lad, he had ſores on his fingers which ſuppurated, and which occaſioned a pretty ſevere indiſpoſition. Six years afterwards I inſerted variolous matter into his arm repeatedly, without being

able to produce any thing more than ſlight inflammation, which appeared very ſoon after the matter was applied, and afterwards I expoſed him to the contagion of the Small Pox with as little effect *.

CASE XIV.

Secondly, Mr. JAMES COLE, a Farmer in this Pariſh, had a diſeaſe from the ſame ſource as related in the preceding caſe, and ſome years after was inoculated with variolous matter. He had a little pain in the axilla, and felt a ſlight indiſpoſition for three or four hours. A few eruptions ſhewed themſelves on the forehead, but they very ſoon diſappeared without advancing to maturation.

* It is a remarkable fact, and well known to many, that we are frequently foiled in our endeavours to communicate the Small Pox by inoculation to blackſmiths, who in the country are farriers. They often, as in the above inſtance, either reſiſt the contagion entirely, or have the diſeaſe anomalouſly. Shall we not be able now to account for this on a rational principle?

CASE XV.

ALTHOUGH in the two former inſtances the ſyſtem ſeemed to be ſecured, or nearly ſo, from variolous infection, by the abſorption of matter from ſores produced by the diſeaſed heels of horſes, yet the following caſe renders it probable that this cannot be entirely relied upon, until a diſeaſe has been generated by the morbid matter from the horſe on the nipple of the cow, and paſſed through that medium to the human ſubject *.

Mr. ABRAHAM RIDDIFORD, a Farmer at Stone in this pariſh, in conſequence of dreſſing a mare that had ſore heels, was affected with very painful ſores in both his hands, tumours in each axilla, and ſevere and general indiſpoſition. A Surgeon in the neighbourhood attended him, who, knowing the ſimilarity between the appearance of the ſores upon his hands and thoſe produced by the Cow Pox, and being acquainted alſo with the effects of that diſeaſe on the human conſtitution, aſſured him

* The ſucceeding part will give further explanations of this ſubject.

that he never need to fear the infection of the Small Pox; but this aſſertion proved fallacious, for, on being expoſed to the infection upwards of twenty years afterwards, he caught the diſeaſe, which took its regular courſe in a very mild way. There certainly was a difference perceptible, although it is not eaſy to deſcribe it, in the general appearance of the puſtules from that which we commonly ſee. Other practitioners, who viſited the patient at my requeſt, agreed with me in this point, though there was no room left for ſuſpicion as to the reality of the diſeaſe, as I inoculated ſome of his family from the puſtules, who had the Small Pox, with its uſual appearances, in conſequence.

CASE XVI.

SARAH NELMES, a dairymaid at a Farmer's near this place, was infected with the Cow Pox from her maſter's cows in May, 1796. She received the infection on a part of the hand which had been previouſly in a ſlight degree injured by a ſcratch from a thorn. A large puſtulous ſore and the uſual ſymptoms accompanying

accompanying the diſeaſe were produced in conſequence. The puſtule was ſo expreſſive of the true character of the Cow Pox, as it commonly appears upon the hand, that I have given a repreſentation of it in the annexed plate. The two ſmall puſtules on the wriſts aroſe alſo from the application of the virus to ſome minute abraſions of the cuticle, but the livid tint, if they ever had any, was not conſpicuous at the time I ſaw the patient. The puſtule on the fore finger ſhews the diſeaſe in an earlier ſtage. It did not actually appear on the hand of this young woman, but was taken from that of another, and is annexed for the purpoſe of repreſenting the malady after it has newly appeared.

CASE XVII.

THE more accurately to obſerve the progreſs of the infection, I ſelected a healthy boy, about eight years old, for the purpoſe of INOCULATION FOR THE COW POX. The matter was taken

taken from a ſore on the hand of a dairymaid *, who was infected by her maſter's cows, and it was inſerted, on the 14th of May, 1796, into the arm of the boy by means of two ſuperficial inciſions, barely penetrating the cutis, each about half an inch along.

On the ſeventh day he complained of uneaſineſs in the axilla, and on the ninth he became a little chilly, loſt his appetite, and had a ſlight head-ach. During the whole of this day he was perceptibly indiſpoſed, and ſpent the night with ſome degree of reſtleſſneſs, but on the day following he was perfectly well.

The appearance of the inciſions in their progreſs to a ſtate of maturation were much the ſame as when produced in a ſimilar

* From the ſore on the hand of Sarah Nelmes.—See the preceding caſe and the plate.

manner

manner by variolous matter*. The only difference which I perceived was, in the ſtate of the limpid fluid ariſing from the action of the virus, which aſſumed rather a darker hue, and in that of the efflореſcence ſpreading round the inciſions, which had more of an eryſipelatous look than we commonly perceive when variolous matter has been made uſe of in the ſame manner; but the whole died away (leaving on the inoculated parts ſcabs and ſubſequent eſchars) without giving me or my patient the leaſt trouble.

In order to aſcertain whether the boy, after feeling ſo ſlight an affection of the ſyſtem from the Cow Pox virus, was ſecure from the contagion of the Small Pox, he was inoculated the 1ſt of July following with variolous matter, immediately taken from a puſtule. Several ſlight punctures and inciſions were made on both his arms, and the matter was carefully inſerted,

* This appearance was in great meaſure new to me, and I ever ſhall recollect the pleaſing ſenſations it excited; as, from its ſimilarity to the puſtule produced by variolous inoculation, it inconteſtibly pointed out the cloſe connection between the two diſeaſes, and almoſt anticipated the reſult of my future experiments.

but

but no diſeaſe followed. The ſame appearances were obſervable on the arms as we commonly ſee when a patient has had variolous matter applied, after having either the Cow Pox or the Small Pox. Several months afterwards he was again inoculated with variolous matter, but no ſenſible effect was produced on the conſtitution.

Here my reſearches were interrupted till the ſpring of the year 1798, when from the wetneſs of the early part of the ſeaſon, many of the farmers' horſes in this neighbourhood were affected with ſore heels, in conſequence of which the Cow Pox broke out among ſeveral of our dairies, which afforded me an opportunity of making further obſervations upon this curious diſeaſe.

A mare, the property of a perſon who keeps a dairy in a neighbouring pariſh, began to have ſore heels the latter end of the month of February 1798, which were occaſionally waſhed by the ſervant men of the farm. Thomas Virgoe, William Wherret, and William Haynes, who in conſequence became affected

affected with ſores in their hands, followed by inflamed lymphatic glands in the arms and axillæ, ſhiverings ſucceeded by heat, laſſitude and general pains in the limbs. A ſingle paroxyſm terminated the diſeaſe; for within twenty-four hours they were free from general indiſpoſition, nothing remaining but the ſores on their hands. Haynes and Virgoe, who had gone through the Small Pox from inoculation, deſcribed their feelings as very ſimilar to thoſe which affected them on ſickening with that malady. Wherret never had had the Small Pox. Haynes was daily employed as one of the milkers at the farm, and the diſeaſe began to ſhew itſelf among the cows about ten days after he firſt aſſiſted in waſhing the mare's heels. Their nipples became ſore in the uſual way, with bluiſh puſtules; but as remedies were early applied they did not ulcerate to any extent.

CASE XVIII.

JOHN BAKER, a child of five years old, was inoculated March 16, 1798, with matter taken from a puſtule on the hand

of Thomas Virgoe, one of the ſervants who had been infected from the mare's heels. He became ill on the ſixth day with ſymptoms ſimilar to thoſe excited by Cow-pox matter. On the eighth day he was free from indiſpoſition.

There was ſome variation in the appearance of the puſtule on the arm. Although it ſomewhat reſembled a Small-pox puſtule, yet its ſimilitude was not ſo conſpicuous as when excited by matter from the nipple of the cow, or when the matter has paſſed from thence through the medium of the human ſubject. (See Plate, No. 2.)

This experiment was made to aſcertain the progreſs and ſubſequent effects of the diſeaſe when thus propagated. We have ſeen that the virus from the horſe, when it proves infectious to the human ſubject, is not to be relied upon as rendering the ſyſtem ſecure from variolous infection, but that the matter produced by it on the nipple of the cow is perfectly ſo. Whether its paſſing from the horſe through the human conſtitution, as in the preſent inſtance, will produce a ſimilar effect,

remains

CASE XX.

FROM William Summers the diſeaſe was transferred to William Pead, a boy of eight years old, who was inoculated March 28th. On the ſixth day he complained of pain in the axilla, and on the ſeventh was affected with the common ſymptoms of a patient ſickening with the Small Pox from inoculation, which did not terminate 'till the third day after the ſeizure. So perfect was the ſimilarity to the variolous fever, that I was induced to examine the ſkin, conceiving there might have been ſome eruptions, but none appeared. The efflorescent bluſh around the part punctured in the boy's arm was ſo truly characteriſtic of that which appears on variolous inoculation, that I have given a repreſentation of it. The drawing was made when the puſtule was beginning to die away, and the *areola* retiring from the centre. (See Plate, No. 3.)

CASE XXI.

APRIL 5th. Several children and adults were inoculated from the arm of William Pead. The greater part of them ſickened on the ſixth day, and were well on the ſeventh, but in three of the number a ſecondary indiſpoſition aroſe in conſequence of an extenſive eryſipelatous inflammation which appeared on the inoculated arms. It ſeemed to ariſe from the ſtate of the puſtule, which ſpread out, accompanied with ſome degree of pain, to about half the diameter of a ſixpence. One of theſe patients was an infant of half a year old. By the application of mercurial ointment to the inflamed parts (a treatment recommended under ſimilar circumſtances in the inoculated Small Pox) the complaint ſubſided without giving much trouble.

HANNAH EXCELL, an healthy girl of ſeven years old, and one of the patients above mentioned, received the infection from

from the inſertion of the virus under the cuticle of the arm in three diſtinct points *. The puſtules which aroſe in conſequence, ſo much reſembled, on the ninth day, thoſe appearing from the inſertion of variolous matter, that an experienced Inoculator would ſcarcely have diſcovered a ſhade of difference at that period. Experience now tells me that almoſt the only variation which follows conſiſts in the puſtulous fluids remaining limpid nearly to the time of its total diſappearance; and not, as in the direct Small Pox, becoming purulent.—(See Plate, No. 4.)

CASE XXII.

FROM the arm of this girl matter was taken and inſerted April 12th into the arms of John Marklove, one year and a half old.

Robert F. Jenner, eleven months old,
Mary Pead, five years old, and
Mary James, ſix years old.

* This was not done intentionally, but from the accidental touch of the point of the lancet, one puncture being always ſufficient.

Among

Among theſe Robert F. Jenner did not receive the infection. The arms of the other three inflamed properly, and began to affect the ſyſtem in the uſual manner; but being under ſome apprehenſions from the preceding Caſes that a troubleſome eryſipelas might ariſe, I determined on making an experiment with the view of cutting off its ſource. Accordingly, on the 8th day after the patients had felt an indiſpoſition that was juſt perceptible, of about twelve hours, I applied in two of theſe Caſes out of the three, on the veſicle formed by the virus, a little mild cauſtic, compoſed of equal parts of quick-lime and ſoap, and ſuffered it to remain on the part ſix hours*. It ſeemed to give the children but little uneaſineſs, and effectually anſwered my intention in preventing the appearance of eryſipelas. Indeed it ſeemed to do more, for in half an hour after its application, the indiſpoſition of the children ceaſed†. Theſe precautions were perhaps

* Perhaps a few touches with the lapis ſepticus would have proved equally efficacious.

† What effect would a ſimilar treatment produce in inoculation for the Small Pox?

unneceſſary,

unneceſſary, as the arm of the third child, Mary Pead, which was ſuffered to take its common courſe, ſcabbed quickly, without any eryſipelas *.

CASE XXIII.

FROM this child's arm matter was taken and transferred to that of J. Barge, a boy of ſeven years old. He ſickened on the eighth day, went through the diſeaſe with the uſual ſlight ſymptoms, and without any inflammation on the arm beyond the common efflorescence ſurrounding the puſtule, and appearance ſo often ſeen in inoculated Small Pox.

After the many fruitleſs attempts to give the Small Pox to thoſe who had had the Cow Pox, it did not appear neceſſary, nor was it convenient to me, to inoculate the whole of thoſe who had been the ſubjects of theſe late trials; yet I thought

* The ſubſequent part of this Treatiſe will ſufficiently ſhew the proper practice in caſes of inflammation of the inoculated arm.

it

it right to ſee the effects of variolous matter on ſome of them, particularly William Summers, the firſt of theſe patients who had been infected with matter taken from the cow. He was therefore inoculated with variolous matter from a freſh puſtule; but, as in the preceding Caſes, the ſyſtem did not feel the effects of it in the ſmalleſt degree. I had an opportunity alſo of having this boy (Barge) and William Pead inoculated by my Nephew, Mr. Henry Jenner, whoſe report to me is as follows: "I have inoculated Pead and Barge, two of the boys whom you lately infected with the Cow Pox. On the ſecond day the inciſions were inflamed, and there was a pale inflammatory ſtain around them. On the third day theſe appearances were ſtill increaſing and their arms itched conſiderably. On the fourth day the inflammation was evidently ſubſiding, and on the ſixth it was ſcarcely perceptible. No ſymptom of indiſpoſition followed.

"To convince myſelf that the variolous matter made uſe of was in a perfect ſtate, I at the ſame time inoculated a patient with ſome of it who had never gone through the Cow Pox, and it produced the Small Pox in the uſual regular manner."

Theſe experiments afforded me much ſatisfaction; they proved that the matter in paſſing from one human ſubject to another, through five gradations, loſt none of its original properties, J. Barge being the fifth who received the infection ſucceſſively from William Summers, the boy to whom it was communicated from the cow.

I ſhall

I ſhall now conclude this Inquiry with ſome general obſervations on the ſubject, and on ſome others which are interwoven with it.

Although I preſume it may be unneceſſary to produce further teſtimony in ſupport of my aſſertion " that the Cow Pox protects the human conſtitution from the infection of the Small Pox," yet it affords me conſiderable ſatisfaction to ſay, that Lord Somerville, the Preſident of the Board of Agriculture, to whom this paper was ſhewn by Sir Joſeph Banks, has found upon inquiry that the ſtatements were confirmed by the concurring teſtimony of Mr. Dollan, a ſurgeon, who reſides in a dairy country remote from this, in which theſe obſervations were made. With reſpect to the opinion adduced " that the ſource of the infection is a peculiar morbid matter ariſing in the horſe," although I have not been able to prove it from actual experiments conducted immediately under my own eye, yet the evidence I have adduced appears ſufficient to eſtabliſh it.

They who are not in the habit of conducting experiments may not be aware of the coincidence of circumſtances neceſſary for their being managed ſo as to prove perfectly deciſive; nor how often men engaged in profeſſional purſuits are liable to interruptions which diſappoint them almoſt at the inſtant of their being accompliſhed: however, I feel no room for heſitation reſpecting the common origin of the diſeaſe, being well convinced that it never appears among the cows (except it can be traced to a cow introduced among the general herd which has been previouſly infected, or to an infected ſervant), unleſs they have been milked by ſome one who, at the ſame time, has the care of a horſe affected with diſeaſed heels.

The ſpring of the year 1797, which I intended particularly to have devoted to the completion of this inveſtigation, proved, from its dryneſs, remarkably adverſe to my wiſhes; for it frequently happens, while the farmers' horſes are expoſed to the cold rains which fall at that ſeaſon that their heels become diſeaſed, and no Cow Pox then appeared in the neighbourhood.

The

The active quality of the virus from the horſes' heels is greatly increaſed after it has acted on the nipples of the cow, as it rarely happens that the horſe affects his dreſſer with ſores, and as rarely that a milk-maid eſcapes the infection when ſhe milks infected cows. It is moſt active at the commencement of the diſeaſe, even before it has acquired a pus-like appearance; indeed I am not confident whether this property in the matter does not entirely ceaſe as ſoon as it is ſecreted in the form of pus. I am induced to think it does ceaſe*, and that it is the thin darkiſh-looking fluid only, oozing from the newly-formed cracks in the heels, ſimilar to what ſometimes appears from eryſipelatous bliſters, which gives the diſeaſe. Nor am I certain that the nipples of the cows are at all times in a ſtate to receive the infection. The appearance of the diſeaſe in the ſpring and the early part of the ſummer, when they are diſpoſed to be affected with ſpontaneous eruptions ſo much more frequently than at other ſeaſons, induces me to think, that the

* It is very eaſy to procure pus from old ſores on the heels of horſes. This I have often inſerted into ſcratches made with a lancet, on the ſound nipples of cows, and have ſeen no other effects from it than ſimple inflammation.

virus

virus from the horſe muſt be received upon them when they are in this ſtate, in order to produce effects: experiments, however, muſt determine theſe points. But it is clear that when the Cow-pox virus is once generated, that the cows cannot reſiſt the contagion, in whatever ſtate their nipples may chance to be, if they are milked with an infected hand.

Whether the matter, either from the cow or the horſe, will affect the ſound ſkin of the human body, I cannot poſitively determine; probably it will not, unleſs on thoſe parts where the cuticle is extremely thin, as on the lips for example. I have known an inſtance of a poor girl who produced an ulceration on her lip by frequently holding her finger to her mouth to cool the raging of a Cow-pox ſore by blowing upon it. The hands of the farmers' ſervants here, from the nature of their employments, are conſtantly expoſed to thoſe injuries which occaſion abraſions of the cuticle, to punctures from thorns and ſuch like accidents; ſo that they are always in a ſtate to feel the conſequences of expoſure to infectious matter.

It is ſingular to obſerve that the Cow-pox virus, although it renders the conſtitution unſuſceptible of the variolous, ſhould, nevertheleſs, leave it unchanged with reſpect to its own action. I have already produced an inſtance * to point out this, and ſhall now corroborate it with another.

Elizabeth Wynne, who had the Cow Pox in the year 1759, was inoculated with variolous matter, without effect, in the year 1797, and again caught the Cow Pox in the year 1798. When I ſaw her, which was on the eighth day after ſhe received the infection, I found her affected with general laſſitude, ſhiverings, alternating with heat, coldneſs of the extremities, and a quick and irregular pulſe. Theſe ſymptoms were preceded by a pain in the axilla. On her hand was one large puſtulous ſore, which reſembled that delineated in Plate No. 1. †

* See Caſe IX.

† As I have before obſerved, theſe ſymptoms probably aroſe from the irritation of the ſore, which was very painful.

It is curious alſo to obſerve, that the virus, which with reſpect to its effects is undetermined and uncertain previouſly to its paſſing from the horſe through the medium of the cow *, ſhould then not only become more active, but ſhould invariably and completely poſſeſs thoſe ſpecific properties which induce in the human conſtitution ſymptoms ſimilar to thoſe of the variolous fever, and effect in it that peculiar change which for ever renders it unſuſceptible of the variolous contagion.

May it not then be reaſonably conjectured, that the ſource of the Small Pox is morbid matter of a peculiar kind, generated by a diſeaſe in the horſe, and that accidental circumſtances may have again and again ariſen, ſtill working new changes upon it, until it has acquired the contagious and malignant form under which we now commonly ſee it making its devaſtations amongſt us? And, from a conſideration of the change which the infectious matter undergoes from producing a diſeaſe on the cow, may we not conceive that many contagious diſeaſes, now

* Further explanations will be adduced on this ſubject.

prevalent

prevalent amongſt us, may owe their preſent appearance not to a ſimple, but to a compound origin? For example, is it difficult to imagine that the meaſles, the ſcarlet fever, and the ulcerous ſore throat with a ſpotted ſkin, have all ſprung from the ſame ſource, aſſuming ſome variety in their forms according to the nature of their new combinations? The ſame queſtion will apply reſpecting the origin of many other contagious diſeaſes, which bear a ſtrong analogy to each other.

There are certainly more forms than one, without conſidering the common variation between the confluent and diſtinct, in which the Small Pox appears in what is called the natural way.—About ſeven years ago a ſpecies of Small Pox ſpread through many of the towns and villages of this part of Glouceſterſhire: it was of ſo mild a nature, that a fatal inſtance was ſcarcely ever heard of, and conſequently ſo little dreaded by the lower orders of the community, that they ſcrupled not to hold the ſame intercourſe with each other as if no infectious diſeaſe had been preſent among them. I never ſaw nor heard of an inſtance of its being confluent. The moſt accurate man-

ner, perhaps, in which I can convey an idea of it is, by ſaying, that had fifty individuals been taken promiſcuouſly and infected by expoſure to this contagion, they would have had as mild and light a diſeaſe as if they had been inoculated with variolous matter in the uſual way. The harmleſs manner in which it ſhewed itſelf could not ariſe from any peculiarity either in the ſeaſon or the weather, for I watched its progreſs upwards of a year without perceiving any variation in its general appearance. I conſider it then as a *variety* of the Small Pox *.

In ſome of the preceding caſes I have noticed the attention that was paid to the ſtate of the variolous matter previous to the experiment of inſerting it into the arms of thoſe who had gone through the Cow Pox. This I conceived to be of great importance in conducting theſe experiments, and were it always

* My friend Dr. Hicks, of Briſtol, who during the prevalence of this diſtemper was reſident at Glouceſter, and Phyſician to the Hoſpital there, (where it was ſeen ſoon after its firſt appearance in this country) had opportunities of making numerous obſervations upon it, which it is his intention to communicate to the Public.

properly

properly attended to by thoſe who inoculate for the Small Pox, it might prevent much ſubſequent miſchief and confuſion. With the view of enforcing ſo neceſſary a precaution, I ſhall take the liberty of digreſſing ſo far as to point out ſome unpleaſant facts, relative to miſmanagement in this particular, which have fallen under my own obſervation.

A Medical Gentleman (now no more), who for many years inoculated in this neighbourhood, frequently preſerved the variolous matter intended for his uſe, on a piece of lint or cotton, which in its fluid ſtate was put into a vial, corked, and conveyed into a warm pocket; a ſituation certainly favourable for ſpeedily producing putrefaction in it. In this ſtate (not unfrequently after it had been taken ſeveral days from the puſtules) it was inſerted into the arms of his patients, and brought on inflammation of the inciſed parts, ſwellings of the axillary glands, fever, and ſometimes eruptions. But what was this diſeaſe? Certainly not the Small Pox; for the matter having from putrefaction loſt, or ſuffered a derangement in its ſpecific properties, was no longer capable of producing that malady,

thoſe who had been inoculated in this manner being as much ſubject to the contagion of the Small Pox, as if they had never been under the influence of this artificial diſeaſe; and many, unfortunately, fell victims to it, who thought themſelves in perfect ſecurity. The ſame unfortunate circumſtance of giving a diſeaſe, ſuppoſed to be the Small Pox, with inefficaceous variolous matter, having occurred under the direction of ſome other practitioners within my knowledge, and probably from the ſame incautious method of ſecuring the variolous matter, I avail myſelf of this opportunity of mentioning what I conceive to be of great importance; and, as a further cautionary hint, I ſhall again digreſs ſo far as to add another obſervation on the ſubject of Inoculation.

Whether it be yet aſcertained by experiment, that the quantity of variolous matter inſerted into the ſkin makes any difference with reſpect to the ſubſequent mildneſs or violence of the diſeaſe, I know not; but I have the ſtrongeſt reaſon for ſuppoſing that if either the punctures or inciſions be made ſo deep as to go *through* it, and wound the adipoſe membrane, that the riſk of bringing on a violent diſeaſe is greatly increaſed. I

have known an inoculator, whoſe practice was " to cut deep enough (to uſe his own expreſſion) to ſee a bit of fat," and there to lodge the matter. The great number of bad Caſes, independent of inflammations and abſceſſes on the arms, and the fatality which attended this practice was almoſt inconceivable; and I cannot account for it on any other principle than that of the matter being placed in this ſituation inſtead of the ſkin.

It was the practice of another, whom I well remember, to pinch up a ſmall portion of the ſkin on the arms of his patients and to paſs through it a needle, with a thread attached to it previouſly dipped in variolous matter. The thread was lodged in the perforated parts, and conſequently left in contact with the cellular membrane. This practice was attended with the ſame ill ſucceſs as the former. Although it is very improbable that any one would now inoculate in this rude way by deſign, yet theſe obſervations may tend to place a double guard over the lancet, when infants, whoſe ſkins are comparatively ſo very thin, fall under the care of the inoculator.

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A very reſpectable friend of mine, Dr. Hardwicke, of Sodbury in this county, inoculated great numbers of patients previous to the introduction of the more modern method by Sutton, and with ſuch ſucceſs, that a fatal inſtance occurred as rarely as ſince that method has been adopted. It was the doctor's practice to make as ſlight an inciſion as poſſible *upon* the ſkin, and there to lodge a thread ſaturated with the variolous matter. When his patients became indiſpoſed, agreeably to the cuſtom then prevailing, they were directed to go to bed, and were kept moderately warm. Is it not probable then, that the ſucceſs of the modern practice may depend more upon the method of invariably depoſiting the virus in or upon the ſkin, than on the ſubſequent treatment of the diſeaſe?

I do not mean to inſinuate that expoſure to cool air, and ſuffering the patient to drink cold water when hot and thirſty, may not moderate the eruptive ſymptoms, and leſſen the number of puſtules; yet, to repeat my former obſervation, I cannot account for the uninterrupted ſucceſs, or nearly ſo, of one practitioner, and the wretched ſtate of the patients under the

care of another, where, in both inſtances, the general treatment did not differ eſſentially, without conceiving it to ariſe from the different modes of inſerting the matter for the purpoſe of producing the diſeaſe. As it is not the identical matter inſerted which is abſorbed into the conſtitution, but that which is, by ſome peculiar proceſs in the animal economy, generated by it, is it not probable that different parts of the human body may prepare or modify the virus differently. Although the ſkin, for example, adipoſe membrane, or mucous membranes are all capable of producing the variolous virus by the ſtimulus given by the particles originally depoſited upon them, yet I am induced to conceive that each of theſe parts is capable of producing ſome variation in the qualities of the matter previous to its affecting the conſtitution. What elſe can conſtitute the difference between the Small Pox when communicated caſually, or in what has been termed the natural way, or when brought on artificially through the medium of the ſkin? After all, are the variolous particles, poſſeſſing their true ſpecific and contagious principles, ever taken up and conveyed by the lymphatics unchanged into the blood veſſels? I imagine not. Were

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this the caſe, ſhould we not find the blood ſufficiently loaded with them in ſome ſtages of the Small Pox to communicate the diſeaſe by inſerting it under the cuticle, or by ſpreading it on the ſurface of an ulcer? Yet experiments have determined the impracticability of its being given in this way; although it has been proved that variolous matter when much diluted with water, and applied to the ſkin in the uſual manner, will produce the diſeaſe. But it would be digreſſing beyond a proper boundary, to go minutely into this ſubject here.

At what period the Cow Pox was firſt noticed here is not upon record. Our oldeſt farmers were not unacquainted with it in their earlieſt days, when it appeared among their farms without any deviation from the phænomena which it now exhibits. Its connection with the Small Pox ſeems to have been unknown to them. Probably the general introduction of inoculation firſt occaſioned the diſcovery.

Its riſe in this country may not have been of very remote date, as the practice of milking cows might formerly have been

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in the hands of women only; which I believe is the caſe now in ſome other dairy countries, and conſequently that the cows might not in former times have been expoſed to the contagious matter brought by the men ſervants from the heels of horſes. Indeed a knowledge of the ſource of the infection is new in the minds of moſt of the farmers in this neighbourhood, but has at length produced good conſequences; and it ſeems probable from the precautions they are now diſpoſed to adopt, that the appearance of the Cow Pox here may either be entirely extinguiſhed or become extremely rare.

Should it be aſked whether this inveſtigation be a matter of mere curioſity, or whether it tend to any beneficial purpoſe, I ſhould anſwer, that notwithſtanding the happy effects of Inoculation, with all the improvements which the practice has received ſince its firſt introduction into this country, it not very unfrequently produces deformity of the ſkin, and ſometimes, under the beſt management, proves fatal.

Theſe circumſtances muſt naturally create in every inſtance ſome degree of painful ſolicitude for its conſequences. But as I have never known fatal effects ariſe from the Cow Pox, even when impreſſed in the moſt unfavourable manner, producing extenſive inflammations and ſuppurations on the hands; and as it clearly appears that this diſeaſe leaves the conſtitution in a ſtate of perfect ſecurity from the infection of the Small Pox, may we not infer that a mode of Inoculation may be introduced preferable to that at preſent adopted, eſpecially among thoſe families, which, from previous circumſtances, we may judge to be prediſpoſed to have the diſeaſe unfavourably? It is an exceſs in the number of puſtules which we chiefly dread in the Small Pox; but, in the Cow Pox, no puſtules appear, nor does it ſeem poſſible for the contagious matter to produce the diſeaſe from effluvia, or by any other means than contact, and that probably not ſimply between the virus and the cuticle; ſo that a ſingle individual in a family might at any time receive it without the riſk of infecting the reſt, or of ſpreading a diſtemper that fills a country with terror. Several inſtances have come under my obſervation, which juſtify the aſſertion that the diſeaſe

cannot

cannot be propagated by effluvia. The firſt boy whom I inoculated with the matter of Cow Pox, ſlept in a bed, while the experiment was going forward, with two children who never had gone through either that diſeaſe or the Small Pox, without infecting either of them.

A young woman who had the Cow Pox to a great extent, ſeveral ſores which maturated having appeared on the hands and wriſts, ſlept in the ſame bed with a fellow dairymaid who never had been infected with either the Cow Pox or the Small Pox, but no indiſpoſition followed.

Another inſtance has occurred of a young woman on whoſe hands were ſeveral large ſuppurations from the Cow Pox, who was at the ſame time a daily nurſe to an infant, but the complaint was not communicated to the child.

In ſome other points of view, the inoculation of this diſeaſe appears preferable to the variolous inoculation.

In conſtitutions prediſpoſed to ſcrophula, how frequently we ſee the inoculated Small Pox rouſe into activity that diſtreſsful malady. This circumſtance does not ſeem to depend on the manner in which the diſtemper has ſhewn itſelf, for it has as frequently happened among thoſe who have had it mildly, as when it has appeared in the contrary way.

There are many, who from ſome peculiarity in the habit reſiſt the common effects of variolous matter inſerted into the ſkin, and who are in conſequence haunted through life with the diſtreſſing idea of being inſecure from ſubſequent infection. A ready mode of diſſipating anxiety originating from ſuch a cauſe muſt now appear obvious. And, as we have ſeen that the conſtitution may at any time be made to feel the febrile attack of Cow Pox, might it not, in many chronic diſeaſes, be introduced into the ſyſtem, with the probability of affording relief, upon well-known phyſiological principles *?

* Inoculation in a common way upon the arm will ſeldom produce this effect. When the diſeaſe takes place among the Dairy people, the virus comes in contact with pre-exiſting ſores, which does not fail to produce an irritation that affects the ſyſtem generally.

Although

Although I ſay the ſyſtem may at any time be made to feel the febrile attack of Cow Pox, yet I have a ſingle inſtance before me where the virus acted locally only, but it is not in the leaſt probable that the ſame perſon would reſiſt the action both of the Cow-pox virus and the variolous.

Elizabeth Sarſenet lived as a dairymaid at Newpark farm, in this pariſh. All the cows and the ſervants employed in milking had the Cow Pox; but this woman, though ſhe had ſeveral ſores upon her fingers, felt no tumours in the axillæ, nor any general indiſpoſition. On being afterwards caſually expoſed to variolous infection, ſhe had the Small Pox in a mild way *.—Hannah Pick, another of the dairymaids, who was a fellow-ſervant with Elizabeth Sarſenet when the diſtemper broke out at the farm, was at the ſame time infected; but this young woman had not only ſores upon her hands, but felt herſelf alſo much indiſpoſed for a day or two. After this, I made ſeveral attempts to give her the Small Pox by inoculation, but they all

* This will be more ſatisfactorily explained in the ſequel.

proved fruitleſs. From the former Caſe, then, we ſee that the animal economy is ſubject to the ſame laws in one diſeaſe as the other.

The following Caſe, which has very lately occurred, renders it highly probable that not only the heels of the horſe, but other parts of the body of that animal, are capable of generating the virus which produces the Cow Pox.

An extenſive inflammation of the eryſipelatous kind appeared without any apparent cauſe upon the upper part of the thigh of a ſucking colt, the property of Mr. Millet, a farmer at Rockhampton, a village near Berkeley. The inflammation continued ſeveral weeks, and at length terminated in the formation of three or four ſmall abſceſſes. The inflamed parts were fomented, and dreſſings were applied by ſome of the ſame perſons who were employed in milking the cows. The number of cows milked was twenty-four, and the whole of them had the Cow Pox. The milkers, conſiſting of the farmer's wife, a man and a maid ſervant, were infected by the cows. The

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man ſervant had previouſly gone through the Small Pox, and felt but little of the Cow Pox. The ſervant maid had ſome years before been infected with the Cow Pox, and ſhe alſo felt it now in a ſlight degree. But the farmer's wife, who never had gone through either of theſe diſeaſes, felt its effects very ſeverely.

That the diſeaſe produced upon the cows by the colt, and from thence conveyed to thoſe who milked them, was the *true* and not the *ſpurious* Cow Pox *, there can be ſcarcely any room for ſuſpicion; yet it would have been more completely ſatiſfactory, had the effects of variolous matter been aſcertained on the farmer's wife, but there was a peculiarity in her ſituation which prevented my making the experiment.

Thus far have I proceeded in an inquiry, founded, as it muſt appear, on the baſis of experiment; in which, however, conjecture has been occaſionally admitted, in order to preſent to

* See page 7.

perſons

perſons well ſituated for ſuch diſcuſſions, objects for a more minute inveſtigation. In the mean time I ſhall myſelf continue to proſecute this inquiry, encouraged by the pleaſing hope of its becoming eſſentially beneficial to mankind.

FURTHER

FURTHER

OBSERVATIONS

ON THE

VARIOLÆ VACCINÆ.

ADVERTISEMENT.

THE foregoing pages contain the whole of my firſt Treatiſe on the Variolæ Vaccinæ, publiſhed in June, 1798. The importance of the Inquiry to the whole human race naturally excited univerſal attention. Ingenuity and induſtry were ſet in motion: but as phyſiological diſcuſſions are ever liable to error, from the complicated nature of their character, I ſoon clearly perceived that this theory, ſo beneficial to mankind, was liable to fall into diſrepute, and to be wholly diſcredited by the force of haſty concluſions unfounded on experiment.

To guard the public mind from prejudice, and to enforce the neceſſity of a ſcrupulous precaution in the conduct of inoculation with vaccine matter, I was induced to offer to the world "Further Obſervations" on the diſeaſe, which were publiſhed in the beginning of the year 1799. Theſe Treatiſes I have here combined, together with ſome additions, which the continuance of the Inquiry has enabled me to ſubmit to the public.

FURTHER

FURTHER

OBSERVATIONS,

&c. &c.

ALTHOUGH it has not been in my power to extend the Inquiry into the cauſes and effects of the Variolæ Vaccinæ much beyond its original limits, yet, perceiving that it is beginning to excite a general ſpirit of inveſtigation, I think it of importance, without delay, to communicate ſuch facts as have ſince occurred, and to point out the fallacious ſources from whence a diſeaſe reſembling the true Variolæ Vaccinæ might ariſe, with the view of preventing thoſe who may inoculate from producing a ſpurious

ſpurious diſeaſe; and further, to enforce the precaution ſuggeſted in the former Treatiſe on the ſubject, of ſubduing the inoculated puſtule as ſoon as it has ſufficiently produced its influence on the conſtitution. From a want of due diſcrimination of the real exiſtence of the diſeaſe either in the brute or in the human ſubject, and alſo of that ſtage of it in which it is capable of producing the change in the animal economy, which renders it unſuſceptible of the contagion of the Small Pox, unpleaſant conſequences might enſue, the ſource of which, perhaps, might not be ſuſpected by one inexperienced in conducting ſuch experiments.

My late publication contains a relation of moſt of the facts which had come under my own inſpection at the time it was written, interſperſed with ſome conjectural obſervations. Since then Dr. G. Pearſon has eſtabliſhed an inquiry into the validity of my principal aſſertion, the reſult of which cannot but be highly flattering to my feelings. It contains not a ſingle caſe which I think can be called an exception to the fact I was ſo firmly impreſſed with — that the Cow Pox protects the human body

body from the Small Pox. I have myſelf received ſome further confirmations, which ſhall be ſubjoined. I have lately alſo been favoured with a letter from a gentleman of great reſpectability (Dr. Ingenhouſz) informing me that, on making an inquiry into the ſubject in the county of Wilts, he diſcovered that a farmer near Calne had been infected with the Small Pox after having had the Cow Pox, and that the diſeaſe in each inſtance was ſo ſtrongly characteriſed, as to render the facts incontrovertible. The Cow Pox, it ſeems, from the Doctor's information, was communicated to the farmer from his cows at the time that they gave out *an offenſive ſtench from their udders.*

Some other inſtances have likewiſe been repreſented to me of the appearance of the diſeaſe, apparently marked with its characteriſtic ſymptoms, and yet that the patients have afterwards had the Small Pox. On theſe Caſes I ſhall, for the preſent, ſuſpend any particular remarks, but hope that the general obſervations I have to offer in the ſequel will prove of ſufficient weight to render the idea of their ever having had exiſtence, but as caſes of ſpurious Cow Pox, extremely doubtful.

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Ere I proceed, let me be permitted to obſerve, that Truth, in this and every other phyſiological Inquiry that has occupied my attention, has ever been the object of my purſuit; and ſhould it appear in the preſent inſtance, that I have been led into error, fond as I may appear of the offspring of my labours, I had rather ſee it periſh at once, than exiſt and do a public injury.

I ſhall proceed to enumerate the ſources, or what appear to me as ſuch, of a ſpurious Cow Pox.

1ſt. That ariſing from puſtules on the nipples or udder of the cow; which puſtules contain no ſpecific virus.

2dly. From matter (although originally poſſeſſing the ſpecific virus) which has ſuffered a decompoſition, either from putrefaction or from any other cauſe leſs obvious to the ſenſes.

3dly. From matter taken from an ulcer in an advanced ſtage, which ulcer aroſe from a true Cow Pock.

4thly.

4thly. From matter produced on the human ſkin from contact with ſome peculiar morbid matter generated by a horſe.

On theſe ſubjects I ſhall offer ſome comments. Firſt—To what length puſtulous diſeaſes of the udder and nipples of the cow may extend, it is not in my power to determine; but certain it is, that theſe parts of the animal are ſubject to ſome variety of maladies of this nature; and as many of theſe eruptions (probably all of them) are capable of giving a diſeaſe to the human body, would it not be diſcreet for thoſe engaged in this inveſtigation to ſuſpend controverſy and cavil until they can aſcertain with preciſion what *is* and what *is not* the genuine Cow Pox?

For example.—A farmer who is not converſant with any of theſe maladies, but who may have heard of the Cow Pox in general terms, may acquaint a neighbouring ſurgeon that the diſtemper appears at his farm. The ſurgeon, eager to make an experiment, takes away matter, inoculates, produces a ſore,

uneaſineſs in the axilla, and perhaps ſome affection of the ſyſtem. This is a way in which a fallacious idea of ſecurity both in the mind of the inoculator and the patient may ariſe; for a diſeaſe may thus have been propagated from a ſimple eruption only.

One of the firſt objects then of this purſuit, as I have obſerved, ſhould be, to learn how to diſtinguiſh with accuracy between that peculiar puſtule which is the *true* Cow Pock, and that which is *ſpurious*. Until experience has determined this, we view our object through a miſt. Let us for inſtance ſuppoſe, that the Small Pox and the Chicken Pox were at the ſame time to ſpread among the inhabitants of a country which had never been viſited by either of theſe diſtempers, and where they were quite unknown before; what confuſion would ariſe! The reſemblance between the ſymptoms of the eruptive fever and between the puſtules in either caſe would be ſo ſtriking, that a patient, who had gone through the Chicken Pox to any extent, would feel equally eaſy with regard to his future ſecurity from the

the Small Pox, as the perſon who had actually paſſed through that diſeaſe. Time and future obſervation would draw the line of diſtinction.

So I preſume it will be with the Cow Pox, until it is more generally underſtood. All cavilling therefore on the mere report of thoſe who *tell us* they have had this diſtemper, and are afterwards found to be ſuſceptible of the Small Pox, ſhould be ſuſpended. To illuſtrate this, I beg leave to give the following hiſtory:

SARAH MERLIN, of the pariſh of Eaſtington in this county, when about thirteen or fourteen years of age, lived as a ſervant with farmer Clarke, who kept a dairy, conſiſting of about eighteen cows, at Stonehouſe, a neighbouring village. The nipples and udders of three of the cows were extenſively affected with large white bliſters. Theſe cows the girl milked daily, and at the ſame time ſhe aſſiſted, with two others, in milking the reſt of the herd. It ſoon appeared that the diſeaſe was communicated to the girl. The reſt of the cows eſcaped the infection,

although they were milked ſeveral days after the three above ſpecified had theſe eruptions on the nipples and udders, and even after the girl's hand became ſore. The two others who were engaged in milking, although they milked the cows indiſcriminately, received no injury. On the fingers of each of the girl's hands there appeared ſeveral large white bliſters, ſhe ſuppoſes about three or four on each finger. The hands and arms inflamed and ſwelled, but no conſtitutional indiſpoſition followed. The ſores were anointed with ſome domeſtic ointment, and got well without ulcerating.

As this malady was called the Cow Pox, and recorded as ſuch in the mind of the patient, ſhe became regardleſs of the Small Pox; but, on being expoſed to it ſome years afterwards, ſhe was infected, and had a full burthen.

Now had any one converſant with the habits of the diſeaſe heard this hiſtory, they would have had no heſitation in pronouncing it a caſe of ſpurious Cow Pox; conſidering its deviation in the *numerous* bliſters which appeared on the girl's hands;

hands; their termination without ulceration; its not proving more generally contagious at the farm, either among the cattle or thoſe employed in milking; and conſidering alſo that *the patient felt no general indiſpoſition, although there was ſo great a number of veſicles.*

This is perhaps the moſt deceptious form in which an eruptive diſeaſe can be communicated from the cow, and it certainly requires ſome attention in diſcriminating it. The moſt perfect criterion by which the judgment may be guided, is perhaps that adopted by thoſe who attend infected cattle. Theſe white bliſters on the nipples, they ſay, *never eat into the fleſhy parts* like thoſe which are commonly of a blueiſh caſt, and which conſtitute the *true Cow Pox*, but that they affect the ſkin only, quickly end in ſcabs, and are not nearly ſo infectious.

That which appeared to me as one cauſe of ſpurious eruptions, I have already remarked in the former Treatiſe, namely, the tranſition that the Cow makes in the ſpring from a poor to a nutritious diet, and from the udder's becoming at this time more

more vaſcular than uſual for the ſupply of milk. But there is another ſource of inflammation and puſtules, which I believe is not uncommon in all the dairy counties in the weſt of England. A cow intended to be expoſed for ſale, having naturally a ſmall udder, is previouſly for a day or two neither milked artificially, nor is her calf ſuffered to have acceſs to her. Thus the milk is preternaturally accumulated, and the udder and nipples become greatly diſtended. The conſequences frequently are, inflammation and eruptions, which maturate.

Whether a diſeaſe generated in this way has the power of affecting the conſtitution in any *peculiar* manner, I cannot preſume poſitively to determine. It has been conjectured to have been a cauſe of the true Cow Pox, though my inquiries have not led me to adopt this ſuppoſition in any one inſtance; on the contrary, I have known the milkers affected by it, but always found that an affection thus induced left the ſyſtem as ſuſceptible of the Small Pox as before.

What is advanced in my ſecond poſition, I conſider alſo of very

very great importance, and I could wiſh it to be ſtrongly impreſſed on the minds of all who may be diſpoſed to conclude haſtily on my obſervations, whether engaged in their inveſtigation by experiments or not.—To place this in its cleareſt point of view (as the ſimilarity between the action of the Small Pox and the Cow Pox matter is ſo obvious) it will be neceſſary to conſider what we ſometimes obſerve to take place in inoculation for the Small Pox when imperfect variolous matter is made uſe of. The conciſe hiſtory on this ſubject that was brought forward reſpecting what I had obſerved in this neighbourhood*, I perceive by a reference ſince made to the Memoirs of the Medical Society of London, may be conſidered as no more than a corroboration of the facts very clearly detailed by Mr. Kite†. To this copious evidence I have to add ſtill more in the following communications from Mr. Earle, ſurgeon, of

* Inquiry into the Cauſes and Effects of the Variolæ Vaccinæ, page 51.

† See an account of ſome anomalous appearances conſequent to the inoculation of the Small Pox, by Charles Kite, Surgeon, of Graveſend, in the Memoirs of the Medical Society of London. Vol. iv. page 114.

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Frampton-upon-Severn, in this county, which I deem the more valuable, as he has with much candour permitted me to make them public.

" Sir,

" I have read with ſatisfaction your late publication on the Variolæ Vaccinæ, and being, among many other curious circumſtances, particularly ſtruck with that relating to the inefficacy of Small-pox matter in a particular ſtate, I think it proper to lay before you the following facts which came within my own knowledge, and which certainly tend to ſtrengthen the opinions advanced in pages 51 and 52 of your Treatiſe.

" In March, 1784, a general inoculation took place at Arlingham in this county. I inoculated ſeveral patients with active variolous matter, all of whom had the diſeaſe in a favourable way; but my matter being all uſed, and not being able to procure any more in the ſtate I wiſhed, I was under the neceſſity of taking it from a puſtule which, experience has ſince proved, was advanced too far to anſwer the purpoſe I intended. Of five perſons

perſons inoculated with this laſt matter, four took the Small Pox afterwards in the natural way; one of whom died, three recovered, and the other, being cautioned by me to avoid as much as poſſible the chance of catching it, eſcaped from the diſeaſe through life. He died of another diſorder about two years ago.

" Although one of theſe caſes ended unfortunate, yet I cannot ſuppoſe that any medical man will think me careleſs or inattentive in their management; for I conceive the appearances were ſuch as might have induced any one to ſuppoſe that the perſons were perfectly ſafe from future infection. Inflammation in every caſe took place in the arm, and fever came on with a conſiderable degree of pain in the axilla. In ſome of their arms the inflammation and ſuppuration were more violent than is commonly obſerved when perfect matter is made uſe of; in one there was an ulcer which caſt off ſeveral large ſloughs. About the ninth day eruptions appeared, which died away earlier than common without maturation.—From theſe circumſtances I ſhould ſuppoſe that no medical practitioner would ſcarcely have entertained a doubt but that theſe patients had been infected with a true Small

Pox; yet I muſt confeſs that ſome ſmall degree of doubt preſented itſelf to me at the ſpeedy diſappearance of the eruptions; and in order, as far as I could, to aſcertain their ſafety, I ſent one of them to a much older practitioner than myſelf. This gentleman, on hearing the circumſtance of the caſe, pronounced the patient perfectly ſecure from future infection.

" The following facts are alſo a ſtriking proof of the truth of your obſervations on this ſubject:

" In the year 1789 I inoculated three children of Mr. Coaley, of Hurſt-farm in this county. The arms inflamed properly, fever and pain in the axilla came on preciſely the ſame as in the former caſes, and in ten days eruptions appeared, which diſappeared in the courſe of two days. I muſt obſerve that the matter here made uſe of was procured for me by a friend: but no doubt it was in an improper ſtate; for, from the ſimilarity of theſe caſes to thoſe which happened at Arlingham five years before, I was ſomewhat alarmed for their ſafety, and deſired to inoculate them again; which being permitted, I was particularly careful

careful to procure matter in its moſt perfect ſtate. All the children took the Small Pox from this ſecond inoculation, and all had a very full burthen. Theſe facts I conceive ſtrikingly corroborate your opinion relative to the different ſtates of matter; for in both the inſtances that I have mentioned it was capable of producing ſomething ſtrongly reſembling the true Small Pox, although it afterwards proved not to be ſo.

" As I think the communication of theſe Caſes is a duty I owe to the Public, you are at liberty to make what uſe you pleaſe of this letter.

" I remain, &c.

Frampton-upon-Severn, Glouceſterſhire,
November 10, 1798.

" JOHN EARLE.

" P. S. I think it neceſſary to obſerve, that I can pronounce with the greateſt certainty, that the matter with which the Arlingham patients were inoculated was taken from a true Small-pox puſtule. I took it myſelf from a ſubject that had a very full burthen."

Certain then it is that variolous matter may undergo ſuch a

change from the putrefactive proceſs, as well as from ſome of the more obſcure and latent proceſſes of nature, as will render it incapable of giving the Small Pox in ſuch a manner as to ſecure the human conſtitution from future infection, although we ſee at the ſame time it is capable of exciting a diſeaſe which bears ſo ſtrong a reſemblance to it, as to produce inflammation and matter in the inciſed ſkin (frequently indeed more violent than when it produces its effects perfectly), ſwelling of the axillary glands, general indiſpoſition, and eruptions. So ſtrongly perſuaded was the gentleman, whoſe practice I have mentioned in page 51 of the late Treatiſe, that he could produce a mild Small Pox by his mode of managing the matter, that he ſpoke of it as a uſeful diſcovery, until convinced of his error by the fatal conſequence which enſued.

After this ought we to be in the ſmalleſt degree ſurpriſed to find, among a great number of individuals who, by living in dairies, have been caſually expoſed to the Cow-pox virus when in a ſtate analogous to that of the Small Pox above deſcribed, ſome who may have had the diſeaſe ſo imperfectly, as not to render

render them ſecure from variolous attacks? For the matter, when burſt from the puſtules on the nipples of the Cow, by being expoſed, from its lodgment there, to the heat of an inflamed ſurface, and from being, at the ſame time, in a ſituation to be occaſionally moiſtened with milk, is often likely to be in a ſtate conducive to putrefaction; and thus, under ſome modification of decompoſition, it muſt of courſe ſometimes find acceſs to the hand of the milker in ſuch a way as to infect him. What confuſion ſhould we have, were there no other mode of inoculating the Small Pox than ſuch as would happen from handling the diſeaſed ſkin of a perſon labouring under that diſtemper in ſome of its advanced and loathſome ſtages! It muſt be obſerved, that every caſe of Cow Pox in the human ſpecies, whether communicated by deſign or otherwiſe, is to be conſidered as a caſe of inoculation. And here I may be allowed to make an obſervation on the caſe of the farmer, communicated to me by Dr. Ingenhouſz. That he was expoſed to the matter when it had undergone the putrefactive change, is highly probable from the Doctor's obſerving that the ſick cows at the farm gave out an *offenſive ſtench from their udders*. However, I muſt remark, that it is unuſual

unuſual for cattle to ſuffer to ſuch an extent, when diſordered with the Cow Pox, as to make a by-ſtander ſenſible of any ill ſmell. I have often ſtood among a herd which had the diſtemper without being conſcious of its preſence from any particular effluvia. Indeed, in this neighbourhood it commonly receives an early check from eſcharotic applications of the *cow leech*. It has been conceived to be contagious among cows without contact; but this idea cannot be well founded, becauſe the cattle in one meadow do not infect thoſe in another (although there may be no other partition than a hedge) unleſs they be handled or milked by thoſe who bring the infectious matter with them; and of courſe the ſmalleſt particle imaginable, when applied to a part ſuſceptible of its influence, may produce the effect. Among the human ſpecies it appears to be very clear, that the diſeaſe is produced by contact only. All my attempts, at leaſt, to communicate it by effluvia have hitherto proved ineffectual.

As well as the perfect change from that ſtate in which variolous matter is capable of producing full and deciſive effects on the conſtitution, to that wherein its ſpecific properties are entirely

entirely loſt, it may reaſonably be ſuppoſed that it is capable of undergoing a variety of intermediate changes. The following ſingular occurrences in ten caſes of inoculation, obligingly communicated to me by Mr. Trye, Senior Surgeon to the Infirmary at Glouceſter, ſeem to indicate that the variolous matter, previouſly to its being taken from the patient for the intended purpoſe, was beginning to part with ſome of its original properties; or, in other words, that it had ſuffered a partial decompoſition. Mr. Trye ſays, "I inoculated ten children with matter taken at one time, and from the ſame ſubject. I obſerved no peculiarity in any of them previouſly to their inoculation, nor did any thing remarkable appear in their arms till after the decline of the diſeaſe. Two infants of three months old had eryſipelas about the inciſions, in one of them extending from the ſhoulders to the fingers' ends. Another infant had abſceſſes in the cellular ſubſtance in the neighbourhood of the inciſions, and five or ſix of the reſt had axillary abſceſſes. The matter was taken from the diſtinct Small Pox late in its progreſs, and when ſome puſtules had been dried. It was received upon glaſs, and ſlowly dried by the fire. All the children had puſtules which maturated,

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ſo that I ſuppoſe them all ſecure from future infection; at leaſt, as ſecure as any others whom I have ever inoculated. My practice never afforded a ſore arm before."

In regard to my former obſervation on the improper and dangerous mode of preſerving variolous matter, I ſhall here remark, that it ſeems not to have been clearly underſtood. Finding that it has been confounded with the more eligible modes of preſervation, I will explain myſelf further. When the matter is taken from a fit puſtule, and properly prepared for preſervation, it may certainly be kept without loſing its ſpecific properties a great length of time; for inſtance, when it is previouſly dried in the open air on ſome compact body, as a quill or a piece of glaſs, and afterwards ſecured in a ſmall vial *. But when kept ſeveral days in a ſtate of moiſture, and during that time expoſed to a warm temperature, I do not think it can be relied upon as capable of giving a *perfect diſeaſe*, although, as I

* Thus prepared, the Cow-pox virus was found perfectly active, and poſſeſſing all its ſpecific properties, at the end of three months.

have before obſerved, the progreſs of the ſymptoms ariſing from the action of the imperfect matter bear ſo ſtrong a reſemblance to the Small Pox when excited completely.

3dly. That the firſt formed virus, or what conſtitutes the true Cow-pock puſtule, invariably poſſeſſes the power I have aſcribed to it, namely, that of affecting the conſtitution with a ſpecific diſeaſe, is a truth that no ſubſequent occurrence has yet led me to doubt. But as I am now endeavouring to guard the public as much as poſſible againſt erroneous concluſions, I ſhall obſerve, that when this puſtule has degenerated into an ulcer (to which ſtate it is ſometimes diſpoſed to paſs, unleſs timely checked) I ſuſpect that matter poſſeſſing very different properties may ſooner or later be produced; and although it may have paſſed that ſtage wherein the ſpecific properties of the matter ſecreted are no longer preſent in it, yet when applied to a ſore (as in the caſual way) it might diſpoſe that ſore to ulcerate, and from its irritation the ſyſtem would probably become affected; and thus, by aſſuming ſome of its ſtrongeſt characters, it would imitate the genuine Cow Pox.

From the preceding obſervations on the matter of Small Pox when decompoſed, it muſt, I conceive, be admitted, that Cow-pox matter in the ſtate now deſcribed may produce a diſeaſe, the effects of which may be felt both locally and generally, yet that the diſeaſe thus induced may not be effectual in obviating the future effects of variolous contagion. In the caſe of Mary Miller, related by Mr. Kite in the volume above alluded to, it appears that the inflammation and ſuppuration of the inoculated arm were more than uſually ſevere, although the ſyſtem underwent no ſpecific change from the action of the virus; which appears from the patient's ſickening ſeven weeks afterwards with the natural Small Pox, which went through its courſe. Some of the Caſes communicated by Mr. Earle tend further to confirm this fact, as the matter there manifeſtly produced ulceration on the inoculated part to a conſiderable extent.

4thly. Whether the Cow Pox is a ſpontaneous diſeaſe in the cow, or is to be attributed to matter conveyed to the animal; as I have conceived, from the horſe, is a queſtion, which though I ſhall not attempt now fully to diſcuſs, yet I ſhall digreſs ſo far as

as to adduce ſome farther obſervations, and to give my reaſons more at large for taking up an opinion that to ſome has appeared fanciful. The aggregate of theſe obſervations, though not amounting to poſitive proof, forms preſumptive evidence of ſo forcible a kind, that I imagine it might on any other perſon have made the ſame impreſſion it did on me, without fixing the imputation of credulity.

Firſt. I conceived this was its ſource, from obſerving that where the Cow Pox had appeared among the dairies here (unleſs it could be traced to the introduction of an infected cow or ſervant) it had been preceded at the farm by a horſe diſeaſed in the manner already deſcribed, which horſe had been attended by ſome of the milkers.

Secondly. From its being a popular opinion throughout this great dairy country, and from its being inſiſted on by thoſe who here attend ſick cattle.

Thirdly. From the total abſence of the diſeaſe in thoſe

 countries,

countries, where the men ſervants are not employed in the dairies *.

Fourthly. From having obſerved that morbid matter generated by the horſe frequently communicates, in a caſual way, a diſeaſe to the human ſubject ſo like the Cow Pox, that in many caſes it would be difficult to make the diſtinction between one and the other †.

Fifthly. From being induced to ſuppoſe from experiments, that ſome of thoſe who had been thus affected from the horſe reſiſted the Small Pox.

Sixthly. From the progreſs and general appearance of the puſtule on the arm of the boy whom I inoculated with matter taken from the hand of a man infected by a horſe; and from the

* This information was communicated to me from the firſt authorities.

† The ſound ſkin does not appear to be ſuſceptible of this virus when inſerted into it, but, when previouſly diſeaſed from little accidents, its effects are often conſpicuous. See Plate No. 2.

ſimilarity

ſimilarity to the Cow Pox of the general conſtitutional ſymptoms which followed*.

I fear it would be treſpaſſing too far to adduce the general teſtimony of our farmers in ſupport of this opinion; yet I beg leave to introduce an extract of a letter on this ſubject from the Rev. Mr. Moore, of Chalford Hill, in this county.

" In the month of November, 1797, my horſe had diſeaſed heels, which was certainly what is termed the greaſe; and at a ſhort ſubſequent period my cow was alſo affected with what a neighbouring farmer (who was converſant with the complaints

* This Caſe (on which I laid no inconſiderable ſtreſs in my late Treatiſe, as preſumptive evidence of the fact adduced) ſeems to have been either miſtaken or overlooked by thoſe who have commented upon the ſubject.—See Caſe xviii, page 33. The boy unfortunately died of a fever at a pariſh workhouſe before I had an opportunity of obſerving what effects would have been produced by the matter of Small Pox. The experiments publiſhed by Mr. Simmons of Mancheſter, and others on the ſubject, with the view of refuting this Theory, appear to have but little weight, as even the Cow-pock virus itſelf, when repeatedly introduced into the ſound nipples of cows by means of a lancet, was found to produce no effect.

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of cattle) pronounced to be the Cow Pox, which he at the ſame time obſerved my ſervant would be infected with: and this proved to be the caſe; for he had eruptions on his hands, face, and many parts of the body, the puſtules appearing large, and not much unlike the Small Pox, for which he had been inoculated a year and a half before, and had then a very heavy burthen. The puſtules on the face might ariſe from contact with his hands, as he had a habit of rubbing his forehead, where the ſores were the largeſt and thickeſt.

"The boy aſſociated with the farmer's ſons during the continuance of the diſeaſe, neither of whom had had the Small Pox, but they felt no ill effects whatever. He was not much indiſpoſed, as the diſeaſe did not prevent him from following his occupations as uſual. No other perſon attended the horſe or milked the cow, but the lad above mentioned. I am firmly of opinion that the diſeaſe in the heels of the horſe, which was a virulent greaſe, was the origin of the ſervant's and the cow's malady."

But

But to return to the more immediate object of this propoſition.

From the ſimilarity of ſymptoms, both conſtitutional and local, between the Cow Pox and the diſeaſe received from morbid matter generated by a horſe, the common people in this neighbourhood, when infected with this diſeaſe, through a ſtrange perverſion of terms, frequently called the Cow Pox. Let us ſuppoſe then ſuch a malady to appear among ſome of the ſervants at a farm, and at the ſame time that the Cow Pox were to break out among the cattle; and let us ſuppoſe too that ſome of the ſervants were infected in this way, and that others received the infection from the cows. It would be recorded at the farm, and among the ſervants themſelves, wherever they might afterwards be diſperſed, that they had all had the Cow Pox. But it is clear that an individual thus infected from the horſe, would neither be for a certainty ſecure himſelf, nor would he impart ſecurity to others, were they inoculated by virus thus generated. He ſtill would be in danger of taking the Small Pox. Yet were this to happen before the nature of the Cow Pox

be

be more maturely conſidered by the public, my evidence on the ſubject might be depreciated unjuſtly. For an exemplification of what is here advanced relative to the nature of the infection when received directly from the horſe, ſee Inquiry into the Cauſes and Effects of the Variolæ Vaccinæ, pages 25, 26, 27, 28, and page 33; and by way of further example, I beg leave to ſubjoin the following intelligence received from Mr. Fewſter, Surgeon, of Thornbury, in this county, a gentleman perfectly well acquainted with the appearances of the Cow Pox on the human ſubject.

WILLIAM MORRIS, aged thirty-two, ſervant to Mr. Cox of Almonſbury, in this county, applied to me the 2d of April, 1798. He told me, that four days before, he found a ſtiffneſs and ſwelling in both his hands, which were ſo painful, it was with difficulty he continued his work; that he had been ſeized with pain in his head, ſmall of the back, and limbs, and with frequent chilly fits ſucceeded by fever. On examination I found him ſtill affected with theſe ſymptoms, and that there was a great proſtration of ſtrength. Many parts of his hands on

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the inſide were chapped, and on the middle joint of the thumb of the right hand there was a ſmall phagedenic ulcer, about the ſize of a large pea, diſcharging an ichorous fluid. On the middle finger of the ſame hand there was another ulcer of a ſimilar kind. Theſe ſores were of a *circular* form, and he deſcribed their firſt appearance as being ſomewhat like bliſters ariſing from a burn. He complained of exceſſive pain, which extended up his arm into the axilla. Theſe ſymptoms and appearances of the ſores were ſo exactly like the Cow Pox, that I pronounced he had taken the diſtemper from milking cows. He aſſured me he had not milked a cow for more than half a year, and that his maſter's cows had nothing the matter with them. I then aſked him if his maſter had a *greaſy* horſe? which he anſwered in the affirmative; and further ſaid, that he had conſtantly dreſſed him twice a day for the laſt three weeks or more, and remarked that the ſmell of his hands was much like that of the horſe's heels. On the 5th of April I again ſaw him, and found him ſtill complaining of pain in both his hands, nor were his febrile ſymptoms at all relieved. The ulcers had now ſpread to the ſize of a ſeven-ſhilling gold coin, and another ulcer, which

I had not noticed before; appeared on the firſt joint of the fore-finger of the left hand, equally painful with that on the right. I ordered him to bathe his hands in warm bran and water, applied eſcharotics to the ulcers, and wrapped his hands up in a ſoft cataplaſm. The next day he was much relieved, and in ſomething more than a fortnight got well. He loſt his nails from the thumb and fingers that were ulcerated."

The ſudden diſappearance of the ſymptoms in this caſe, after the application of the eſcharotics to the ſores, is worthy of obſervation; it ſeems to ſhew that they were kept up by the irritation of the ulcers.

The general ſymptoms which I have already deſcribed of the Cow Pox, when communicated in a caſual way to any great extent, will, I am convinced, from the many Caſes I have ſeen, be found accurate; but from the very ſlight indiſpoſition which enſues in caſes of inoculation, where the puſtule, after affecting the conſtitution, quickly runs into a ſcab ſpontaneouſly, or is artificially ſuppreſſed by ſome proper application, I am induced

to believe that the violence of the ſymptoms may be aſcribed to the inflammation and irritation of the ulcers (when ulceration takes place to any extent, as in the caſual Cow Pox), and that the conſtitutional ſymptoms which appear during the preſence of the ſore, while it aſſumes the character of a puſtule only, are felt but in a very trifling degree. This mild affection of the ſyſtem happens when the diſeaſe makes but a ſlight local impreſſion on thoſe who have been accidentally infected by cows; and, as far as I have ſeen, it has uniformly happened among thoſe who have been inoculated, when a puſtule only, and no great degree of inflammation or any ulceration, has taken place from the inoculation. The following Caſes will ſtrengthen this opinion:

The Cow Pox appeared at a farm in the village of Stonehouſe, in this county, about Michaelmas laſt, and continued gradually to paſs from one cow to another till the end of November. On the 26th of that month ſome ichorous matter was taken from a cow, and dried upon a quill. On the 2d of December ſome of it was inſerted into a ſcratch, made ſo ſuperficial, that no blood

appeared, on the arm of Sufan Phipps, a child ſeven years old. The common inflammatory appearances took place in conſequence, and advanced till the fifth day, when they had ſo much ſubſided, that I did not conceive any thing further would enſue.

6th. Appearances ſtationary.

7th. The inflammation began to advance.

8th. A veſication perceptible on the edges, forming, as in the inoculated Small Pox, an appearance not unlike a grain of wheat, with the cleft or indention in the centre.

9th. Pain in the axilla.

10th. A little head-ache; pulſe 110; tongue not diſcoloured; countenance in health.

11th.—12th. No perceptible illneſs; pulſe about 100.

13th. The puſtule was now ſurrounded by an efflorеſcence, interſperſed with very minute confluent puſtules, to the extent of about an inch. Some of theſe puſtules advanced in ſize and maturated. So exact was the reſemblance of the arm at this ſtage to the general appearance of the inoculated Small Pox, that

Mr. D.

Mr. D. a neighbouring ſurgeon, who took ſome matter from it, and who had never ſeen the Cow Pox before, declared he could not perceive any difference*. The child's arm now ſhewed a diſpoſition to ſcab, and remained nearly ſtationary for two or three days, when it began to run into an ulcerous ſtate; and *then* commenced a febrile indiſpoſition, accompanied with an increaſe of axillary tumour. The ulcer continued ſpreading near a week, during which time the child continued ill, when it increaſed to a ſize nearly as large as a ſhilling. It began now to diſcharge pus; granulations ſprung up, and it healed. This child had before been of a remarkably ſickly conſtitution, but is now in very high health.

* That the Cow Pox was a ſuppoſed guardian of the conſtitution from the action of the Small Pox, has been a prevalent idea for a long time paſt; but the ſimilarity in the conſtitutional effects between one diſeaſe and the other, could never have been ſo accurately obſerved, had not the inoculation of the Cow Pox placed it in a new and ſtronger point of view. This practice too has ſhewn us what before lay concealed, the riſe and progreſs of the puſtule formed by the inſertion of the virus, which places in a moſt conſpicuous light its ſtriking reſemblance to the puſtule formed from the inoculated Small Pox.

MARY HEARN, twelve years of age, was inoculated with matter taken from the arm of Sufan Phipps.

6th day. A puſtule beginning to appear, ſlight pain in the axilla.

7th. A diſtinct veſicle formed.

8th. The veſicle increaſing; edges very red; no deviation in its appearance at this time from the inoculated Small Pox.

9th. No indiſpoſition; puſtule advancing.

10th. The patient felt this evening a ſlight febrile attack.

11th. Free from indiſpoſition.

12th.—13th. The ſame.

14th. An efflóreſcence of a faint red colour, extending ſeveral inches round the arm. The puſtule beginning to ſhew a diſpoſition to ſpread, was dreſſed with an ointment compoſed of *hydrarg. nit. rub. & ung. ceræ.* The efflóreſcence itſelf was covered with a plaſter of *ung. hydr. fort.*—In ſix hours it was examined, when it was found that the efflóreſcence had totally diſappeared. The application of the ointment with the *hydr. nit. rub.* was made uſe of for three days, when the ſtate of the puſtule remaining ſtationary, it was exchanged for the *ung. hydr. nit.* This appeared to have a more active effect than the former

former, and in two or three days the virus ſeemed to be ſubdued, when a ſimple dreſſing was made uſe of; but the ſore again ſhewing a diſpoſition to inflame, the *ung. hydr. nit.* was again applied, and ſoon anſwered the intended purpoſe effectually. The girl after the tenth day, when, as has been obſerved, ſhe became a little ill, ſhewed not the leaſt ſymptom of indiſpoſition. She was afterwards expoſed to the action of variolous matter, and completely reſiſted it. Suſan Phipps alſo went through a ſimilar trial. Conceiving theſe Caſes to be important, I have given them in detail; firſt, to urge the precaution of uſing ſuch means as may ſtop the progreſs of the puſtule; and ſecondly, to point out (what appears to be the fact) that the moſt material indiſpoſition, or at leaſt that which is felt moſt ſenſibly, *does not ariſe primarily from the firſt action of the virus on the conſtitution, but that it often comes on, if the puſtule is left to chance, as a ſecondary diſeaſe.* This leads me to conjecture, what experiment muſt finally determine, that they who have had the Small Pox are not afterwards ſuſceptible of the primary action of the Cow-pox virus; for ſeeing that the ſimple virus itſelf, when it has not paſſed beyond the boundary of a veſicle, excites in the

ſyſtem

ſyſtem ſo little commotion, is it not probable the trifling illneſs thus induced may be loſt in that which ſo quickly, and oftentimes ſo ſeverely, follows in the *caſual Cow Pox* from the preſence of corroding ulcers? This conſideration induces me to ſuppoſe that I may have been miſtaken in my former obſervation on this ſubject.

In this reſpect, as well as many others, a parallel may be drawn between this diſeaſe and the Small Pox. In the latter, the patient firſt feels the effect of what is called the abſorption of the virus. The ſymptoms then often nearly retire, when a freſh attack commences different from the firſt, and the illneſs keeps pace with the progreſs of the puſtules through their different ſtages of maturation, ulceration, &c.

Although the application I have mentioned in the caſe of Mary Hearn proved ſufficient to check the progreſs of ulceration, and prevent any ſecondary ſymptoms, yet, after the puſtule has duly exerted its influence, I ſhould prefer the deſtroying it quickly and effectually to any other mode. The term cauſtic to

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a tender ear (and I conceive none will feel more intereſted in this Inquiry than the anxious guardians of a nurſery) may found harſh and unpleaſing, but every ſolicitude that may ariſe on this account will no longer exiſt, when it is underſtood that the puſtule in a ſtate fit to be acted upon is then quite ſuperficial, and that it does not occupy the ſpace of a ſilver penny*.

As a proof of the efficacy of this practice, even before the virus had fully exerted itſelf on the ſyſtem, I ſhall lay before my reader the following hiſtory.

By a reference to the Treatiſe on the Variolæ Vaccinæ, it will be ſeen, that in the month of April, 1798, four children were inoculated with the matter of Cow Pox; and that in two of theſe caſes the virus on the arm was deſtroyed ſoon after it had produced a perceptible ſickening. Mary James, aged ſeven

* I mention eſcharotics for ſtopping the progreſs of the puſtule, becauſe I am acquainted with their efficacy; probably more ſimple means might anſwer the purpoſe quite as well, ſuch as might be found among the mineral and vegetable aſtringents.

years, one of the children alluded to, was inoculated in the month of December following with freſh variolous matter, and at the ſame time was expoſed to the effluvia of a patient affected with the Small Pox. The appearance and progreſs of the infected arm was, in every reſpect, ſimilar to that which we generally obſerve when variolous matter has been inſerted into the ſkin of a perſon who has not previouſly undergone either the Cow Pox or the Small Pox. On the eighth day, conceiving there was infection in it, ſhe was removed from her reſidence among thoſe who had not had the Small Pox. I was now anxiouſly waiting the reſult, conceiving from the ſtate of the girl's arm ſhe would fall ſick about this time. On viſiting her on the evening of the following day (the ninth), all I could learn from the woman who attended her was, that ſhe felt ſomewhat hotter than uſual during the night, but was not reſtleſs; and that in the morning there was the faint appearance of a raſh about her wriſts. This went off in a few hours, and was not at all perceptible to me on my viſit in the evening. Not a ſingle eruption appeared, the ſkin having been repeatedly and carefully examined. The inoculated arm continued to make

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the uſual progreſs to the end, through all the ſtages of inflammation, maturation, and ſcabbing.

On the eighth day matter was taken from the arm of this girl, (Mary James,) and inſerted into the arms of her mother and brother, (neither of whom had had either the Small Pox or the Cow Pox,) the former about fifty years of age, the latter ſix.

On the eighth day after the inſertion, the boy felt indiſpoſed, and continued unwell two days, when a meaſles-like raſh appeared on his hands and wriſts, and was thinly ſcattered over his arms. The day following his body was marbled over with an appearance ſomewhat ſimilar, but he did not complain, nor did he appear indiſpoſed. A few puſtules now appeared, the greater part of which went away without maturating.

On the ninth day the mother began to complain. She was a little chilly, and had a head-ache for two days, but *no puſtule appeared on the ſkin*, nor had ſhe any appearance of a raſh.

The family was attended by an elderly woman as a nurſe, who in her infancy had been expoſed to the contagion of the Small Pox, but had reſiſted it. This woman was now infected, but had the diſeaſe in the ſlighteſt manner, a very few eruptions appearing, two or three of which only maturated.

From a ſolitary inſtance like that adduced of Mary James, whoſe conſtitution appears to have reſiſted the action of the variolous virus, after the influence of the Cow-pox virus had been ſo ſoon arreſted in its progreſs, no poſitive concluſion can be fairly drawn; nor from the hiſtory of the three other patients who were ſubſequently infected; but nevertheleſs the facts collectively may be deemed intereſting.

That one mild variety of the Small Pox has appeared, I have already plainly ſhewn*; and by the means now mentioned we probably may have it in our power to produce at will another.

At the time when the puſtule was deſtroyed in the arm of

* See Inquiry into the Cauſes and Effects of the Variolæ Vaccinæ, page 49.

Mary

Mary James, I was informed ſhe had been indiſpoſed about twelve hours; but I am now aſſured by thoſe who were with her, that the ſpace of time was much leſs. Be that as it may, in Caſes of Cow-pox inoculation, I would not recommend any application to ſubdue the action of the puſtule, until convincing proofs had appeared of the patient's having felt its effects at leaſt twelve hours. No harm indeed could enſue, were a longer period to elapſe before the application was made uſe of. In ſhort, it ſhould be ſuffered to have as full an effect as it could, conſiſtently with the ſtate of the arm.

As the caſes of inoculation multiply, I am more and more convinced of the extreme mildneſs of the ſymptoms ariſing merely from the primary action of the virus on the conſtitution, and that thoſe ſymptoms which (as in the accidental Cow Pox) affect the patient with ſeverity, are entirely ſecondary, excited by the irritating proceſſes of inflammation and ulceration; and it appears to me that this ſingular virus poſſeſſes an irritating quality of a peculiar kind; but as a ſingle Cow-pox puſtule is

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all that is neceſſary to render the variolous virus ineffectual, and as we poſſeſs the means of allaying the irritation, ſhould any ariſe, it becomes of little or no conſequence.

It appears then (as far as an inference can be drawn from the preſent progreſs of Cow-pox inoculation) that it is an accidental circumſtance only, which can render this a violent diſeaſe, and a circumſtance of that nature, which fortunately it is in the power of almoſt every one to avoid. I allude to the communication of the diſeaſe from cows. In this caſe, ſhould the hands of the milker be affected with little accidental ſores to any extent, every ſore would become the *nidus* of infection, and feel the influence of the virus; and the degree of violence in the conſtitutional ſymptoms would be in proportion to the number and to the ſtate of theſe local affections. Hence it follows that a perſon, either by accident or deſign, might be ſo filled with theſe wounds from contact with the virus, that the conſtitution might ſink under the preſſure.

Seeing that we poſſeſs the means of rendering the action of the

ſores mild, which, when left to chance, are capable of producing violent effects; and ſeeing too that theſe ſores bear a reſemblance to the Small Pox, eſpecially the confluent, ſhould it not encourage the hope that ſome topical application might be uſed with advantage to counteract the fatal tendency of that diſeaſe, when it appears in this terrific form? At what ſtage or ſtages of the diſeaſe this may be done with the moſt promiſing expectation of ſucceſs, I will not pretend now to determine. I only throw out this idea as the baſis of further reaſoning and experiment.

I have often been foiled in my endeavours to communicate the Cow Pox by inoculation. An inflammation will ſometimes ſucceed the ſcratch or puncture, and in a few days diſappear without producing any further effect. Sometimes it will even produce an ichorous fluid, and yet the ſyſtem will not be affected*. The ſame thing we know happens with the Small-pox virus.

* At this period of the Inquiry, I had not diſcovered the importance of inoculating with virus newly formed in the puſtule. The Reader will find this explained as he proceeds.

Four or five ſervants were inoculated at a farm contiguous to this place, laſt ſummer, with matter juſt taken from an infected cow. A little inflammation appeared on all their arms, but died away without producing a puſtule; yet all theſe ſervants caught the diſeaſe within a month afterwards from milking the infected cows, and ſome of them had it ſeverely. At preſent, no other mode than that commonly practiſed for inoculating the Small Pox has been uſed for giving the Cow Pox; but it is probable this might be varied with advantage. We ſhould imitate the caſual communication more clearly, were we firſt, by making the ſmalleſt ſuperficial inciſion or puncture on the ſkin, to produce a little ſcab, and then, removing it, to touch the abraded part with the virus. A ſmall portion of a thread imbrued in the virus, (as in the old method of inoculating the Small Pox,) and laid upon the ſlightly inciſed ſkin, might probably prove a ſucceſsful way of giving the diſeaſe; or the cutis might be expoſed in a minute point by an atom of bliſtering plaſter, and the virus brought in contact with it. In the Caſes juſt alluded to, where I did not ſucceed in giving the diſeaſe conſtitutionally,

conſtitutionally, the experiment was made with matter taken in a purulent ſtate from a puſtule on the nipple of a cow *.

Is *pure pus*, though contained in a Small-pox puſtule, ever capable of producing the Small Pox perfectly? I ſuſpect it is not.—Let us conſider that it is always preceded by the limpid fluid, which, in conſtitutions ſuſceptible of variolous contagion, is always infectious; and though, on opening a puſtule, its contents may appear perfectly purulent, yet a given quantity of the limpid fluid may at the ſame time be blended with it, though it would be imperceptible to the only teſt of our ſenſes, the eye. The preſence then of this fluid, or its mechanical diffuſion through pus, may at all times render active, what is apparently *mere pus*, while its total abſence (as in ſtale puſtules) may be attended with the imperfect effects we have ſeen.

It would be digreſſing too widely to go far into the doctrine of ſecretion, but as it will not be quite extraneous, I ſhall juſt

* The cauſe of theſe diſappointments will be explained.

obſerve, that I conſider both the pus and the limpid fluid of the puſtule as ſecretions, but that the organs eſtabliſhed by nature to perform the office of ſecreting theſe fluids may differ eſſentially in their mechanical ſtructure. What but a difference in the organization of glandular bodies, conſtitutes the difference in the qualities of the fluids ſecreted? From ſome peculiar derangement in the ſtructure, or, in other words, ſome deviation in the natural action of a gland deſtined to ſecrete a mild, innoxious fluid, a poiſon of the moſt deadly nature may be created: for example—That gland, which in its ſound ſtate ſecretes pure ſaliva, may, from being thrown into diſeaſed action, produce a poiſon of the moſt deſtructive quality. Nature appears to have no more difficulty in forming minute glands among the vaſcular parts of the body, than ſhe has in forming blood veſſels, and millions of theſe can be called into exiſtence, when inflammation is excited, in a few hours *.

* Mr. Home, in his excellent diſſertation on pus and mucus, juſtifies this aſſertion.

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In the preſent early ſtage of the Inquiry, (for early it certainly muſt be deemed), before we know for an abſolute certainty how ſoon the virus of the Cow Pox may ſuffer a change in its ſpecific properties, after it has quitted the limpid ſtate it poſſeſſed when forming a puſtule, it would be prudent for thoſe who have been inoculated with it to ſubmit to variolous inoculation. No injury or inconvenience can accrue from this; and were the ſame method practiſed among thoſe who, from inoculation, have felt the Small Pox in an unſatisfactory manner at any period of their lives, it might appear that I had not been too officious in offering a cautionary hint, in recommending a ſecond inoculation with matter in its moſt perfect ſtate.

And here let me ſuppoſe, for argument's ſake, (not from conviction,) that one perſon in an hundred, after having had the Cow Pox, ſhould be found ſuſceptible of the Small Pox, would this invalidate the utility of the practice? For, waving all other conſiderations, who will deny that the inoculated Small Pox, though abſtractedly it may be conſidered as harmleſs, does

not involve in itſelf ſomething that in numberleſs inſtances proves baneful to the human frame.

That in delicate conſtitutions it ſometimes excites ſcrophula, is a fact that muſt generally be ſubſcribed to, as it is ſo obvious to common converſation. This conſideration is important.

As the effects of the Small Pox inoculation on thoſe who have had the Cow Pox, will be watched with the moſt ſcrupulous eye by thoſe who proſecute this Inquiry, it may be proper to bring to their recollection ſome facts relative to the Small Pox, which I muſt conſider here as of conſequence, but which hitherto ſeem not to have made a due impreſſion.

It ſhould be remembered that the conſtitution cannot by previous infection be rendered totally unſuſceptible of the variolous poiſon; neither the caſual nor the inoculated Small Pox, whether it produces the diſeaſe in a mild or in a violent way, can perfectly extinguiſh the ſuſceptibility. The ſkin, we know, is ever

ever ready to exhibit, though often in a very limited degree, the effects of the poiſon when inſerted there; and how frequently do we ſee among nurſes, when much expoſed to the contagion, eruptions, and theſe ſometimes preceded by ſenſible illneſs! yet ſhould any thing like an eruption appear, or the ſmalleſt degree of indiſpoſition, upon the inſertion of the variolous matter on thoſe who have gone through the Cow Pox, my aſſertions reſpecting the peculiarities of the diſeaſe might be unjuſtly diſcredited.

I know a gentleman, who many years ago was inoculated for the Small Pox, but having no puſtules, or ſcarcely any conſtitutional affection that was perceptible, he was diſſatisfied, and has ſince been repeatedly inoculated. A veſicle has always been produced in the arm in conſequence, with axillary ſwelling and a ſlight indiſpoſition: this is by no means a rare occurrence. It is probable that the fluid thus excited upon the ſkin would always produce the Small Pox.

On the arm of a perſon who had gone through the Cow Pox, many

many years before, I once produced a veſication by the inſertion of variolous matter, and with a little of the fluid inoculated a young woman, who had a mild, but very efficacious, Small Pox in conſequence, although no conſtitutional effect was produced on the patient from whom the matter was taken. The following communication from Mr. Fewſter affords a ſtill clearer elucidation of this fact.—Mr. Fewſter ſays, " On the 3d of April, 1797, I inoculated Maſter H——, aged fourteen months, for the Small Pox. At the uſual time he ſickened, had a plentiful eruption, particularly on his face, and got well. His nurſemaid, aged twenty-four, had many years before gone through the Small Pox in the natural way, which was evident from her being much pitted with it. She had uſed the child to ſleep on her left arm, with her left cheek in contact with his face, and during his inoculation he had moſtly ſlept in that manner. About a week after the child got well, ſhe (the nurſe) deſired me to look at her face, which ſhe ſaid was very painful. There was a plentiful eruption on the left cheek, *but not on any other part of the body*, which went on to maturation.

" On

" On inquiry I found, that three days before the appearance of the eruption, ſhe was taken with ſlight chilly fits, pain in her head and limbs, and ſome fever. On the appearance of the eruption theſe pains went off, and now (the ſecond day of the eruption) ſhe complains of a little ſore throat. Whether the above ſymptoms are the effects of the Small Pox or a recent cold, I do not know. On the fifth day of the eruption I charged a lancet from two of the puſtules, and on the next day I inoculated two children; one two years, the other four months old, with the matter. At the ſame time I inoculated the mother and eldeſt ſiſter with variolous matter taken from Maſter H——. On the fifth day of their inoculation, *all* their arms were inflamed alike; and on the eighth day, the eldeſt of thoſe inoculated from the nurſe ſickened, and the youngeſt on the eleventh. They had both a plentiful eruption, from which I inoculated ſeveral others, who had the diſeaſe very favourably. The mother and the other child ſickened about the ſame time, and likewiſe had a plentiful eruption.

" Soon after a man in the village ſickened with the Small Pox,

Pox, and had a confluent kind. To be convinced that the children had had the diſeaſe effectually, I took them to his houſe and inoculated them in both arms with matter taken from him, but without effect."

Theſe are not brought forward as uncommon occurrences, but as exemplifications of the human ſyſtem's ſuſceptibility of the variolous contagion, although it has been previouſly ſenſible of its action.

Happy is it for mankind that the appearance of the Small Pox a ſecond time on the ſame perſon beyond a trivial extent, is ſo extremely rare, that it is looked upon as a phenomenon. Indeed, ſince the publication of Dr. Heberden's paper on the *Varicellæ*, or Chicken Pox, the idea of ſuch an occurrence, in deference to authority ſo truly reſpectable, has been generally relinquiſhed. This I conceive has been without juſt reaſon; for after we have ſeen, among many others, ſo ſtrong a Caſe as that recorded by Mr. Edward Withers, Surgeon, of Newbury, Berks, in the Fourth Volume of the Memoirs of the Medical

Society of London, (from which I take the following Extracts,) no one I think will again doubt the fact.

" Mr. RICHARD LANGFORD, a farmer of Weſt Shefford, in this county, (Berks,) about fifty years of age, when about a month old had the Small Pox at a time when three others of the family had the ſame diſeaſe, one of whom, a ſervant man, died of it. Mr. Langford's countenance was ſtrongly indicative of the malignity of the diſtemper, his face being ſo remarkably pitted and ſeamed, as to attract the notice of all who ſaw him, ſo that no one could entertain a doubt of his having had that diſeaſe in a moſt inveterate manner." Mr. Withers proceeds to ſtate that Mr. Langford was ſeized a ſecond time, had a bad confluent Small Pox, and died on the twenty-firſt day from the ſeizure: and that four of the family, as alſo a ſiſter of the patient's, to whom the diſeaſe was conveyed by her ſon's viſiting his uncle, falling down with the Small Pox, fully ſatisfied the country with regard to the nature of the diſeaſe, which nothing ſhort of this would have done:—the ſiſter died.

" This caſe was thought ſo extraordinary a one, as to induce the rector of the pariſh to record the particulars in the pariſh regiſter."

It is ſingular, that in moſt caſes of this kind the diſeaſe in the firſt inſtance has been confluent; ſo that the extent of the ulceration on the ſkin (as in the Cow Pox) is not the proceſs in nature which affords ſecurity to the conſtitution.

As the ſubject of the Small Pox is ſo interwoven with that which is the more immediate object of my preſent concern, it muſt plead my excuſe for ſo often introducing it. At preſent it muſt be conſidered as a diſtemper not well underſtood. The Inquiry I have inſtituted into the nature of the Cow Pox, will probably promote its more perfect inveſtigation.

The Inquiry of Dr. Pearſon into the Hiſtory of the Cow Pox, having produced ſo great a number of atteſtations in favour of my aſſertion that it proves a protection to the human body from the Small Pox, I have not been aſſiduous in ſeeking for more; but as ſome of my friends have been ſo good as to communicate

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the following, I ſhall conclude theſe obſervations with their inſertion.

Extract of a Letter from Mr. Drake, Surgeon, at Stroud, in this county, and late Surgeon to the North Glouceſter Regiment of Militia.

" In the ſpring of the year 1796, I inoculated men, women, and children, to the amount of about ſeventy. Many of the men did not receive the infection, although inoculated at leaſt three times, and kept in the ſame room with thoſe who actually underwent the diſeaſe during the whole time occupied by them in paſſing through it. Being anxious they ſhould in future be ſecure againſt it, I was very particular in my inquiries to find out whether they ever had previouſly had it, or at any time been in the neighbourhood of people labouring under it. But after all, the only ſatisfactory information I could obtain was, that they had had the Cow Pox. As I was then ignorant of ſuch a diſeaſe affecting the human ſubject, I flattered myſelf what they imagined to be the Cow Pox was in reality the Small

Pox in a very ſlight degree. I mentioned the circumſtance in the preſence of ſeveral of the officers, at the ſame time expreſſing my doubts if it were not Small Pox; and was not a little ſurpriſed when I was told by the Colonel, that he had frequently heard you mention the Cow Pox as a diſeaſe endemial to Glouceſterſhire, and that if a perſon were ever affected by it, you ſuppoſed him afterwards ſecure from the Small Pox. This excited my curioſity, and when I viſited Glouceſterſhire I was very inquiſitive concerning the ſubject; and from the information I have ſince received, both from your publication, and from converſation with medical men of the greateſt accuracy in their obſervations, I am fully convinced that what the men ſuppoſed to be the Cow Pox, was actually ſo, and I can ſafely affirm that they effectually reſiſted the Small Pox."

Mr. Fry, Surgeon, at Durſley, in this county, favours me with the following communication:

" During the ſpring of the year 1797, I inoculated fourteen hundred and ſeventy-five patients, of all ages, from a fortnight old

old to ſeventy years; amongſt whom there were many who had previouſly gone through the Cow Pox. The exact number I cannot ſtate; but if I ſay they were near thirty, I am certainly within the number. There was not a ſingle inſtance of the variolous matter producing any conſtitutional effect on theſe people, nor any greater degree of local inflammation than it would have done in the arm of a perſon who had before gone through the Small Pox, notwithſtanding it was invariably inſerted four, five, and ſometimes ſix different times, to ſatisfy the minds of the patients. In the common courſe of inoculation previous to the general one, ſcarcely a year paſſed without my meeting with one or two inſtances of perſons who had gone through the Cow Pox, reſiſting the action of the variolous contagion. I may fairly ſay, that the number of people I have ſeen inoculated with the Small Pox, who at former periods had gone through the Cow Pox, are not leſs than forty*; and in no one inſtance have I known a patient receive the Small Pox, notwith-

* The greater part of theſe people muſt of courſe have had the Cow Pox many years before this trial was made upon them with the matter of Small Pox.—E. J.

ſtanding

ſtanding they invariably continued to aſſociate with other inoculated patients during the progreſs of the diſeaſe, and many of them purpoſely expoſed themſelves to the contagion of the natural Small Pox; whence I am fully convinced, that a perſon who had *fairly* had the Cow Pox, is no longer capable of being acted upon by the variolous matter.

"I alſo inoculated a very conſiderable number of thoſe who had had a diſeaſe which ran through the neighbourhood a few years ago, and was called by the common people the *Swine Pox*, not one of whom received the Small Pox *.

"There were about half a dozen inſtances of people who never had either the Cow or Swine Pox, yet did not receive the Small Pox, the ſyſtem not being in the leaſt deranged, or the arms inflamed, although they were repeatedly inoculated, and aſſociated with others who were labouring under the diſeaſe; one of them was the ſon of a farrier."

* This was that mild variety of the Small Pox which I have noticed in the late Treatiſe on the Cow Pox, page 49.

Mr.

Mr. Tierny, Aſſiſtant Surgeon of the South Glouceſter Regiment of Militia, has obliged me with the following information:

" That in the ſummer of the year 1798, he inoculated a great number of the men belonging to the Regiment, and that among them he found eleven, who, from having lived in dairies, had gone through the Cow Pox. That all of them reſiſted the Small Pox, except one; but that, on making the moſt rigid and ſcrupulous inquiry at the farm in Glouceſterſhire, where the man ſaid he lived when he had the diſeaſe, and among thoſe with whom at the ſame time he declared he had aſſociated, and particularly of a perſon in the pariſh, whom he ſaid had dreſſed his fingers, it moſt clearly appeared that he aimed at an impoſition, and that he never had been affected with the Cow Pox*. Mr. Tierny remarks, that the arms of many who were inoculated, after having had the Cow Pox, inflamed very quickly, and that in ſeveral a little ichorous fluid was formed."

* The public cannot be too much upon their guard reſpecting perſons of this deſcription.

Mr.

Mr. Cline, who in July laſt was ſo obliging, at my requeſt, as to try the efficacy of the Cow-pox virus, was kind enough to give me a letter on the reſult of it, from which the following is an extract:

" My Dear Sir,

" The Cow-pox experiment has ſucceeded admirably. The child ſickened on the ſeventh day, and the fever, which was moderate, ſubſided on the eleventh. The inflammation ariſing from the inſertion of the virus extended to about four inches in diameter, and then gradually ſubſided, without having been attended with pain or other inconvenience. There were no eruptions.

" I have ſince inoculated him with Small-pox matter in three places, which were ſlightly inflamed on the third day, and then ſubſided.

" Dr. Liſter, who was formerly Phyſician to the Small-pox Hoſpital, attended the child with me, and he is convinced that

it

it is not poſſible to give him the Small Pox. I think the ſubſtituting the Cow-pox poiſon for the Small Pox, promiſes to be one of the greateſt improvements that has ever been made in medicine; and the more I think on the ſubject, the more I am impreſſed with its importance.

" With great eſteem

" I am, &c.

" HENRY CLINE."

Lincoln's-Inn Fields,
Auguſt 2, 1798.

From communications, with which I have been favoured from Dr. Pearſon, who has occaſionally reported to me the reſult of his private practice with the vaccine virus in London, and from Dr. Woodville, who has alſo favoured me with an account of his more extenſive inoculation with the ſame virus at the Small-pox Hoſpital, it appears that many of their patients have been affected with eruptions, and that theſe eruptions have maturated in a manner very ſimilar to the variolous. The matter they made uſe of was taken, in the firſt inſtance, from a cow belonging to one of the great milk farms in London.

Having never ſeen maturated puſtules produced either in my own practice among thoſe who were caſually infected by cows, or thoſe to whom the diſeaſe had been communicated by inoculation, I was deſirous of ſeeing the effect of the matter generated in London, on ſubjects living in the country. A thread imbrued in ſome of this matter was ſent to me, and with it two children were inoculated, whoſe Caſes I ſhall tranſcribe from my notes.

STEPHEN JENNER, three years and a half old.

3d day. The arm ſhewed a proper and deciſive inflammation.

6th. A veſicle ariſing.

7th. The puſtule of a cherry colour.

8th. Increaſing in elevation.—A few ſpots now appear on each arm near the inſertion of the inferior tendons of the biceps muſcles. They are very ſmall, and of a vivid red colour. The pulſe natural; tongue of its natural hue; no loſs of appetite, or any ſymptom of indiſpoſition.

9th. The inoculated puſtule on the arm this evening began to inflame, and gave the child uneaſineſs: he cried, and pointed

to

to the ſeat of it, and was immediately afterwards affected with febrile ſymptoms. At the expiration of two hours after the ſeizure, a plaſter of *ung. hydrarg. fort.* was applied, and its effect was very quickly perceptible; for in ten minutes he reſumed his uſual looks and playfulneſs. On examining the arm about three hours after the application of the plaſter, its effects in ſubduing the inflammation were very manifeſt.

10th. The ſpots on the arms have diſappeared, but there are three viſible in the face.

11th. Two ſpots on the face are gone; the other barely perceptible.

13th. The puſtule delineated in the ſecond plate in the Treatiſe on the Variolæ Vaccinæ, is a correct repreſentation of that on the child's arm, as it appears at this time.

14th. Two freſh ſpots appear on the face. The puſtule on the arm nearly converted into a ſcab. As long as any fluid remained in it, it was limpid.

JAMES HILL, four years old, was inoculated on the ſame day, and with part of the ſame matter which infected Stephen

Jenner. It did not appear to have taken effect till the fifth day.

7th. A perceptible veſicle: this evening the patient became a little chilly: no pain or tumour diſcoverable in the axilla.

8th. Perfectly well.

9th. The ſame.

10th. The veſicle more elevated than I have been accuſtomed to ſee it, and aſſuming more perfectly the variolous character than is common with the Cow Pox at this ſtage.

11th. Surrounded by an inflammatory redneſs, about the ſize of a ſhilling, ſtudded over with minute veſicles. The puſtule contained a limpid fluid till the fourteenth day, after which it was incruſted over in the uſual manner; but this incruſtation or ſcab being accidentally rubbed off, it was ſlow in healing.

Theſe children were afterwards fully expoſed to the Small-pox contagion without effect.

Having been requeſted by my friend Mr. Henry Hicks, of Eaſtington,

Eaſtington, in this county, to inoculate two of his children, and at the ſame time ſome of his ſervants and the people employed in his manufactory, matter was taken from the arm of this boy for the purpoſe. The numbers inoculated were eighteen. They all took the infection, and either on the fifth or ſixth day a veſicle was perceptible on the punctured part. Some of them began to feel a little unwell on the eighth day, but the greater number on the ninth. Their illneſs, as in the former Caſes deſcribed, was of ſhort duration, and not ſufficient to interrupt, but at very ſhort intervals, the children from their amuſements, or the ſervants and manufacturers from following their ordinary buſineſs.

Three of the children, whoſe employment in the manufactory was in ſome degree laborious, had an inflammation on their arms beyond the common boundary about the eleventh or twelfth day, when the feveriſh ſymptoms, which before were nearly gone off, again returned, accompanied with increaſe of axillary tumour. In theſe Caſes (clearly perceiving the ſymptoms were governed by the ſtate of the arms) I applied on the inoculated

inoculated puſtules, and renewed the application three or four times within an hour, a pledget of lint, previouſly ſoaked in *aqua lythargyri acetati**, and covered the hot efflorescence ſurrounding them with cloths dipped in cold water.

The next day I found that this ſimple mode of treatment had ſucceeded perfectly. The inflammation was nearly gone off, and with it the ſymptoms which it had produced.

Some of theſe patients have ſince been inoculated with variolous matter without any effect beyond a little inflammation on the part where it was inſerted.

Why the arms of thoſe inoculated with the vaccine matter in the country ſhould be more diſpoſed to inflame than thoſe inoculated in London, it may be difficult to determine. From comparing my own Caſes with ſome tranſmitted to me by Dr. Pearſon and Dr. Woodville, this appears to be the fact: and

* Goulard's Extract of Saturn.

what

what ſtrikes me as ſtill more extraordinary with reſpect to thoſe inoculated in London is, the appearance of maturating eruptions. In the two inſtances only which I have mentioned, (the one from the inoculated, the other from the caſual Cow Pox,) a few red ſpots appeared, which quickly went off without maturating. The Caſe of the Rev. Mr. Moore's ſervant may indeed ſeem like a deviation from the common appearances in the country, but the nature of theſe eruptions was not aſcertained beyond their not poſſeſſing the property of communicating the diſeaſe by their effluvia. Perhaps the difference we perceive in the ſtate of the arms may be owing to ſome variety in the mode of action of the virus upon the ſkin of thoſe who breathe the air of London, and thoſe who live in the country. That the eryſipelas aſſumes a different form in London from what we ſee it put on in the country, is a fact very generally acknowledged. In calling the inflammation, that is excited by the Cow-pox virus, eryſipelatous, perhaps I may not be critically exact, but it certainly approaches near to it. Now, as the diſeaſed action going forward in the part infected with the virus may undergo different modifications, according to the peculiarities of the

conſtitution

conſtitution on which it is to produce its effect, may it not account for the variation which has been obſerved?

To this it may probably be objected, that ſome of the patients inoculated, and who had puſtules in conſequence, were newly come from the country; but I conceive that the changes wrought in the human body through the medium of the lungs, may be extremely rapid. Yet, after all, further experiments made in London with vaccine virus generated in the country, muſt finally throw a light on what now certainly appears obſcure and myſterious.

The principal variation perceptible to me in the action of the vaccine virus generated in London, from that produced in the country, was its proving more certainly infectious, and giving a leſs diſpoſition in the arm to inflame. There appears alſo a greater elevation of the puſtule above the ſurrounding ſkin. In my former caſes, the puſtule produced by the inſertion of the virus was more like one of thoſe which are ſo thickly ſpread over the body in a bad kind of confluent Small Pox. This was more like

like a puſtule of the diſtinct Small Pox, except that I ſaw no inſtance of pus being formed in it, the matter remaining limpid till the period of ſcabbing.

Wiſhing to ſee the effects of the diſeaſe on an infant newly born, my nephew, Mr. Henry Jenner, at my requeſt, inſerted the vaccine virus into the arm of a child about twenty hours old. His report to me is, that the child went through the diſeaſe without apparent illneſs, yet that it was found effectually to reſiſt the action of variolous matter with which it was ſubſequently inoculated.

I have had an opportunity of trying the effects of the Cow-pox matter on a boy who, the day preceding its inſertion, ſickened with the meaſles. The eruption of the meaſles, attended with cough, a little pain in the cheſt, and the uſual ſymptoms accompanying that diſeaſe, appeared on the third day, and ſpread all over him. The diſeaſe went through its courſe without any deviation from its uſual habits; and, notwithſtanding this, the Cow-pox virus excited its common appearances, both

on the arm and on the conſtitution, without any ſenſible interruption; on the ſixth day there was a veſicle.

8th. Pain in the axilla, chilly, and affected with head-ache.

9th. Nearly well.

12th. The puſtule ſpread to the ſize of a large ſplit pea, but without any ſurrounding efflorescence. It ſoon afterwards ſcabbed, and the boy recovered his general health rapidly. But it ſhould be obſerved, that before it ſcabbed, the efflorescence, which had ſuffered a temporary ſuſpenſion, advanced in the uſual manner.

Here we ſee a deviation from the ordinary habits of the Small Pox, as it has been obſerved that the preſence of the meaſles ſuſpends the action of variolous matter. However, the ſuſpenſion of the efflorescence is worthy of obſervation.

The very general inveſtigation that is now taking place, chiefly through inoculation, (and I again repeat my earneſt hope that it may be conducted with that calmneſs and moderation which ſhould ever accompany a philoſophical reſearch,) muſt ſoon place

place the vaccine diſeaſe in its juſt point of view. The reſult of all my trials with the virus on the human ſubject has been uniform. In every inſtance, the patient who has felt its influence has completely loſt the ſuſceptibility for the variolous contagion; and as theſe inſtances are now become numerous, I conceive that, joined to the obſervations in the former part of this paper, they ſufficiently preclude me from the neceſſity of entering into controverſies with thoſe who have circulated reports adverſe to my aſſertions, on no other evidence than what has been caſually collected.

A CONTINUATION OF

FACTS AND OBSERVATIONS

RELATIVE TO THE

VARIOLÆ VACCINÆ.

A

CONTINUATION

OF

FACTS AND OBSERVATIONS

RELATIVE TO THE

VARIOLÆ VACCINÆ,

OR

COW POX.

By EDWARD JENNER, M.D. F.R.S. &c.

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1801.

A CONTINUATION OF

FACTS AND OBSERVATIONS,

&c. &c.

SINCE my former publications on the Vaccine Inoculation, I have had the ſatisfaction of ſeeing it extend very widely. Not only in this country is the ſubject purſued with ardour, but from my correſpondence with many reſpectable medical gentlemen on the Continent, (among whom are *Dr. De Carro* of Vienna, and *Dr. Ballhorn* of Hanover,) I find it is as warmly adopted abroad, where it has afforded the greateſt ſatisfaction. I have

the pleaſure too of ſeeing that the feeble efforts of a few individuals to depreciate the new practice, are ſinking faſt into contempt beneath the immenſe maſs of evidence which has riſen up in ſupport of it.

Upwards of ſix thouſand perſons have now been inoculated with the virus of Cow Pox, and the far greater part of them have ſince been inoculated with that of Small Pox, and expoſed to its infection in every rational way that could be deviſed, without effect.

It was very improbable that the inveſtigation of a diſeaſe ſo analagous to the Small Pox, ſhould go forward without engaging the attention of the Phyſician of the Small-pox Hoſpital in London.

Accordingly, Dr. Woodville, who fills that department with ſo much reſpectability, took an early opportunity of inſtituting an Inquiry into the nature of the Cow Pox. This Inquiry was began in the early part of the preſent year, and in May, Dr. Woodville

Woodville publiſhed the reſult, which differs eſſentially from mine in a point of much importance. It appears that three-fifths of the patients inoculated were affected with eruptions, for the moſt part ſo perfectly reſembling the Small Pox, as not to be diſtinguiſhed from them. On this ſubject it is neceſſary that I ſhould make ſome comments.

When I conſider that out of the great number of Caſes of caſual inoculation immediately from cows, which have from time to time preſented themſelves to my obſervation, and the many ſimilar inſtances which have been communicated to me by medical gentlemen in this neighbourhood; when I conſider too that the matter with which my inoculations were conducted in the years 1797, 98, and 99, was taken from different cows, and that in no inſtance any thing like a variolous puſtule appeared, I cannot feel diſpoſed to imagine that eruptions, ſimilar to thoſe deſcribed by Dr. Woodville, have ever been produced by the *pure, uncontaminated Cow-pock virus:* on the contrary, I do ſuppoſe that thoſe which the Doctor ſpeaks of, originated in the action of variolous matter,

which crept into the conſtitution with the vaccine. And this I preſume happened from the inoculation of a great number of the patients with variolous matter (ſome on the third, others on the fifth day) after the vaccine had been applied; and it ſhould be obſerved, that the matter thus propagated became the ſource of future inoculations in the hands of many medical gentlemen who appeared to have been previouſly unacquainted with the nature of the Cow Pox.

Another circumſtance ſtrongly, in my opinion, ſupporting this ſuppoſition, is the following: The Cow Pox has been known among our dairies time immemorial. If puſtules then, like the variolous, were to follow the communication of it from the cow to the milker, would not ſuch a fact have been known, and recorded at our farms? Yet neither our farmers nor the medical people of the neighbourhood have noticed ſuch an occurrence.

A few ſcattered pimples I have ſometimes, though very rarely, ſeen, the greater part of which have generally diſappeared, quickly

quickly, but ſome have remained long enough to ſuppurate at their apex. That local cuticular inflammation, whether ſpringing up ſpontaneouſly, or ariſing from the application of acrid ſubſtances, ſuch, for inſtance, as *Cantharides*, *Pix Burgundica*, *Antimonium Tartarizatum*, &c. will often produce cutaneous affections, not only near the ſeat of the inflammation, but on ſome parts of the ſkin far beyond its boundary, is a well-known fact. It is, doubtleſs, on this principle that the inoculated Cow-pock puſtule and its concomitant efflorescence may, in very irritable conſtitutions, produce this affection. The eruption I allude to has commonly appeared ſome time in the third week after inoculation. But this appearance is too trivial to excite the leaſt regard.

The change which took place in the general appearance during the progreſs of the vaccine inoculation at the Small-pox Hoſpital ſhould likewiſe be conſidered.

Although at firſt it took on ſo much of the variolous character, as to produce puſtules in three Caſes out of five, yet in Dr. Woodville's

Woodville's laſt report, publiſhed in June, he ſays, "Since the publication of my reports of inoculations for the Cow Pox, upwards of three hundred Caſes have been under my care; and out of this number, only thirty-nine had puſtules that ſuppurated: viz. out of the firſt hundred, nineteen had puſtules; out of the ſecond, thirteen; and out of the laſt hundred and ten, only ſeven had puſtules. Thus it appears that the diſeaſe has become conſiderably milder; which I am inclined to attribute to a greater caution uſed in the choice of the matter, with which the infection was communicated; for lately, that which has been employed for this purpoſe has been taken only from thoſe patients in whom the Cow Pox proved very mild and well characteriſed *.

The inference I am induced to draw from theſe premiſes is very different. The decline, and finally the total extinction nearly of

* In a few weeks after the Cow-pox inoculation was introduced at the Small-pox Hoſpital, I was favoured with ſome virus from this ſtock. In the firſt inſtance it produced a few puſtules, which did not maturate; but in the ſubſequent caſes none appeared.

theſe puſtules, in my opinion, are more fairly attributable to the Cow-pox virus, aſſimilating the variolous *, the former probably being the original, the latter the ſame diſeaſe under a peculiar, and at preſent an inexplicable modification.

One experiment tending to elucidate the point under diſcuſſion, I had myſelf an opportunity of inſtituting. On the ſuppoſition of its being poſſible that the cow which ranges over the fertile meadows in the vale of Glouceſter, might generate a virus differing in ſome reſpects in its qualities from that produced by the animal artificially pampered for the production of milk for the metropolis, I procured, during my reſidence there in the ſpring, ſome Cow-pock virus from a cow at one of the London milk farms †. It was immediately conveyed into Glouceſter-

* In my firſt publication on this ſubject, I expreſſed an opinion that the Small Pox and the Cow Pox were the ſame diſeaſes under different modifications. In this opinion Dr. Woodville has concurred. The axiom of the immortal Hunter, that *two diſeaſed actions cannot take place at the ſame time in one and the ſame part*, will not be injured by the admiſſion of this theory.

† It was taken by Mr. Tanner, then a ſtudent at the Veterinary College, from a cow at Mr. Clark's farm at Kentiſh Town.

ſhire

ſhire to Dr. Marſhall, who was then extenſively engaged in the inoculation of the Cow Pox, the general reſult of which, and of the inoculation in particular with this matter, I ſhall lay before my Readers in the following communication from the Doctor.

" Dear Sir,

" My neighbour, Mr. Hicks, having mentioned your wiſh to be informed of the progreſs of the inoculation here for the Cow Pox, and he alſo having taken the trouble to tranſmit to you my minutes of the Caſes which have fallen under my care, I hope you will pardon the further trouble I now give you in ſtating the obſervations I have made upon the ſubject. When firſt informed of it, having two children who had not had the Small Pox, I determined to inoculate them for the Cow Pox whenever I ſhould be ſo fortunate as to procure matter proper for the purpoſe. I was therefore particularly happy when I was informed that I could procure matter from ſome of thoſe whom you had inoculated. In the firſt inſtance, I had no intention of extending the diſeaſe further than my own family, but the very

very extenſive influence which the conviction of its efficacy in reſiſting the Small Pox has had upon the minds of the people in general, has rendered that intention nugatory, as you will perceive by the continuation of my Caſes incloſed in this letter*, by which it will appear, that ſince the 22d of March I have inoculated an hundred and ſeven perſons; which, conſidering the retired ſituation I reſide in, is a very great number. There are alſo other conſiderations which, beſides that of its influence in reſiſting the Small Pox, appear to have had their weight; namely, the peculiar mildneſs of the diſeaſe, the known ſafety of it, and its not having in any inſtance prevented the patient from following his ordinary buſineſs. In all the Caſes under my care, there have only occurred two or three which required any application owing to eryſipelatous inflammation on the arm, and they immediately yielded to it. In the remainder the conſtitutional illneſs has been ſlight but ſufficiently marked, and conſiderably leſs than I ever obſerved in the ſame

* Dr. Marſhall has detailed theſe Caſes with great accuracy, but their publication would now be deemed ſuperfluous. E. J.

number inoculated with the Small Pox. In only one or two of the Caſes have any other eruptions appeared than thoſe around the ſpot where the matter was inſerted, and thoſe near the infected part. Neither does there appear in the Cow Pox to be the leaſt exciting cauſe to any other diſeaſe, which in the Small Pox has been frequently obſerved, the conſtitution remaining in as full health and vigour after the termination of the diſeaſe as before the infection. Another important conſideration appears to be the impoſſibility of the diſeaſe being communicated, except by the actual contact of the matter of the puſtule, and conſequently the perfect ſafety of the remaining part of the family, ſuppoſing only one or two ſhould wiſh to be inoculated at the ſame time.

"Upon the whole, it appears evident to me, that the Cow Pox is a pleaſanter, ſhorter, and infinitely more ſafe diſeaſe than the inoculated Small Pox, when conducted in the moſt careful and approved manner; neither is the local affection of the inoculated part, or the conſtitutional illneſs near ſo violent. I ſpeak with confidence on the ſubject, having had an opportunity

tunity of obſerving its effects upon a variety of conſtitutions, from three months old to ſixty years; and to which I have paid particular attention. In the Caſes alluded to here you will obſerve, that the removal from the original ſource of the matter has made no alteration or change in the nature or appearance of the diſeaſe, and that it may be continued, *ad infinitum*, (I imagine,) from one perſon to another, (if care be obſerved in taking the matter at a proper period,) without any neceſſity of recurring to the original matter of the cow.

"I ſhould be happy if any endeavours of mine could tend further to elucidate the ſubject, and ſhall be much gratified in ſending you any further obſervations I may be enabled to make.

"I have the pleaſure to ſubſcribe myſelf,

"Dear Sir, &c.

Eaſtington, Glouceſterſhire,
April 26th, 1799.

"JOSEPH H. MARSHALL."

The gentleman who favoured me with the above account has continued to proſecute his inquiries with unremitting induſtry,

 and

and has communicated the result in another letter, which at his request I lay before the public without abbreviation.

Dr. MARSHALL's SECOND LETTER.

"Dear Sir,

"Since the date of my former letter, I have continued to inoculate with the Cow-pox virus. Including the cases before enumerated, the number now amounts to four hundred and twenty-three. It would be tedious and useless to detail the progress of the disease in each individual—it is sufficient to observe, that I noticed no deviation in any respect from the Cases I formerly adduced. The general appearances of the arm exactly corresponded with the account given in your first publication. When they were disposed to become troublesome by erysipelatous inflammation, an application of equal parts of vinegar and water always answered the desired intention. I must not omit to inform you, that when the disease had duly acted upon the constitution, I have frequently used the vitriolic acid. A portion of a drop applied with the head of a probe or

any

any convenient utenſil upon the puſtule, ſuffered to remain about forty ſeconds, and afterwards waſhed off with ſponge and water, never failed to ſtop its progreſs, and expedite the formation of a ſcab.

" I have already ſubjected two hundred and eleven of my patients to the action of variolous matter, *but every one reſiſted it.*

" The reſult of my experiments (which were made with every requiſite caution) has fully convinced me that the *true Cow Pox* is a ſafe and infallible preventive from the Small Pox; that in no caſe which has fallen under my obſervation has it been in any conſiderable degree troubleſome, much leſs have I ſeen any thing like danger; for in no inſtance were the patients prevented from following their ordinary employments.

" In Dr. Woodville's publication on the Cow Pox, I notice an extraordinary fact. He ſays that the generality of his patients had puſtules. It certainly appears extremely extraordinary that

in

in all my Caſes there never was but one puſtule, which appeared on a patient's elbow on the inoculated arm, and maturated. It appeared exactly like that on the inciſed part.

" The whole of my obſervations, founded, as it appears, on an extenſive experience, leads me to theſe obvious concluſions; that thoſe Caſes which have been or may be adduced againſt the preventive powers of the Cow Pox, could not have been thoſe of the true kind, ſince it muſt appear to be abſolutely impoſſible that I ſhould have ſucceeded in ſuch a number of Caſes without a ſingle exception, if ſuch a preventive power did not exiſt. I cannot entertain a doubt that the inoculated Cow Pox muſt quickly ſupercede that of Small Pox. If the many important advantages which muſt reſult from the new practice are duly conſidered, we may reaſonably infer that public benefit, the ſure teſt of the real merit of diſcoveries, will render it generally extenſive.

" To you, Sir, as the diſcoverer of this highly-beneficial practice, mankind are under the higheſt obligations. As a private

private individual, I participate in the general feeling; more particularly as you have afforded me an opportunity of noticing the effects of a ſingular diſeaſe, and of viewing the progreſs of the moſt curious experiment that ever was recorded in the Hiſtory of Phyſiology.

" I remain, Dear Sir, &c.

" JOSEPH H. MARSHALL.

" P. S. I ſhould have obſerved, that of the patients I inoculated and enumerated in my letter, one hundred and twenty-ſeven were infected with the matter you ſent me from the London cow. I diſcovered no diſſimilarity of ſymptoms in theſe caſes, from thoſe which I inoculated from matter procured in this county. No puſtules have occurred, except in one or two caſes, where a ſingle one appeared on the inoculated arm. No difference was apparent in the local inflammation. There was no ſuſpenſion of ordinary employment among the labouring people, nor was any medicine required.

" I have

" I have frequently inoculated one or two in a family, and the remaining part of it ſome weeks afterwards. The uninfected have ſlept with the infected during the whole courſe of the diſeaſe without feeling it; ſo that I am fully convinced the diſeaſe cannot be taken but by actual contact with the matter.

" A curious fact has lately fallen under my obſervation, on which I leave you to comment.

" I viſited a patient with the confluent Small Pox, and charged a lancet with ſome of the matter. Two days afterwards I was deſired to inoculate a woman and four children with the Cow Pox, and I inadvertently took the vaccine matter on the ſame lancet which was before charged with that of Small Pox. In three days I diſcovered the miſtake, and fully expected that my five patients would be infected with Small Pox; but I was agreeably ſurpriſed to find the diſeaſe to be the genuine Cow Pox, which proceeded without deviating in any particular from my

my former caſes. I afterwards inoculated theſe patients with variolous matter, but all of them reſiſted its action.

" I omitted mentioning another great advantage that now occurs to me in the inoculated Cow Pox; I mean the ſafety with which pregnant women may have the diſeaſe communicated to them. I have inoculated a great number of females in that ſituation, and never obſerved their caſes to differ in any reſpect from thoſe of my other patients. Indeed the diſeaſe is ſo mild, that it ſeems as if it might at all times be communicated with the moſt perfect ſafety."

I ſhall here take the opportunity of thanking Dr. Marſhal and thoſe other gentlemen who have obligingly preſented me with the reſult of their inoculations; but, as they all agree in the ſame point as that given in the above communication, namely, the ſecurity of the patient from the effects of the Small Pox after the Cow Pox, their peruſal, I preſume, would afford us ſatisfaction that has not been amply given already. Particular occurrences I ſhall of courſe detail. Some of my correſ-

pondents have mentioned the appearance of Small Pox-like eruptions at the commencement of their inoculations; but in theſe caſes the matter was derived from the original ſtock at the Small-pox Hoſpital.

I have myſelf inoculated a very conſiderable number from the matter produced by Dr. Marſhal's patients, originating in the London cow, without obſerving puſtules of any kind, and have diſperſed it among others who have uſed it with a ſimilar effect. From this ſource Mr. H. Jenner informs me, he has inoculated above an hundred patients without obſerving eruptions. Whether the nature of the virus will undergo any change from being farther removed from its original ſource, in paſſing ſucceſſively from one perſon to another, time alone can determine. That which I am now employing has been in uſe near eight months, and not the leaſt change is perceptible in its mode of action either locally or conſtitutionally. There is therefore every reaſon to expect that its effects will remain unaltered, and that we ſhall not be under the neceſſity of ſeeking freſh ſupplies from the cow.

The

The following obſervations were obligingly ſent me by Mr. Tierny, Aſſiſtant Surgeon to the South Glouceſter Regiment of Militia, to whom I am indebted for a former Report on this ſubject:

"I inoculated with the Cow-pox matter, from the 11th to the latter part of April, twenty-five perſons, including women and children. Some on the 11th were inoculated with the matter Mr. Shrapnell (Surgeon to the Regiment) had from you, the others with matter taken from theſe. The progreſs of the puncture was accurately obſerved, and its appearance ſeemed to differ from the Small Pox in having leſs inflammation around its baſis on the firſt days, that is, from the third to the ſeventh; but after this the inflammation increaſed, extending on the tenth or eleventh day to a circle of an inch and a half from its centre, and threatening very ſore arms; but this, I am happy to ſay, was not the caſe; for, by applying mercurial ointment to the inflamed part, which was repeated daily until the inflammation went off, the arm got well without any further application or

trouble. The conſtitutional ſymptoms which appeared on the eighth or ninth day after inoculation ſcarcely deſerved the name of diſeaſe, as they were ſo ſlight as to be barely perceptible, except that I could connect a ſlight head-ache and languor with a ſtiffneſs and rather painful ſenſation in the axilla. This latter ſymptom was the moſt ſtriking; it remained from twelve to forty-eight hours. In no caſe did I obſerve the ſmalleſt puſtule, or even diſcolouration of the ſkin like an incipient puſtule, except about the part where the virus had been applied.

" After all theſe ſymptoms had ſubſided, and the arms were well, I inoculated four of this number with variolous matter taken from a patient in another regiment. In each of theſe it was inſerted ſeveral times under the cuticle, producing ſlight inflammation on the ſecond or third day, and always diſappearing before the fifth or ſixth; except in one who had the Cow Pox in Glouceſterſhire before he joined us, and who alſo received it at this time by inoculation. In this man the puncture inflamed,

inflamed, and his arm was much ſorer than from the inſertion of the Cow-pox virus; but there was no pain in the axilla, nor could any conſtitutional affection be obſerved.

"I have only to add, that I am now fully ſatisfied of the efficacy of the Cow Pox in preventing the appearance of the Small Pox, and that it is a moſt happy and ſalutary ſubſtitute for it.

"I remain, &c.

"M. J. TIERNY."

Although the ſuſceptibility of the virus of the Cow Pox is for the moſt part loſt in thoſe who have had the Small Pox, yet in ſome conſtitutions it is only partially deſtroyed, and in others it does not appear to be in the leaſt diminiſhed.

By far the greater number on whom trials were made reſiſted it entirely; yet I found ſome on whoſe arms the puſtule, from inoculation, was formed completely, but without producing the

the common efflorescent blush around it, or any constitutional illness, while others have had the disease in the most perfect manner. A case of the latter kind having been presented to me by Mr. Fewster, Surgeon, of Thornbury, I shall insert it.

" Three children were inoculated with the vaccine matter you obligingly sent me. On calling to look at their arms three days after, I was told that John Hodges, one of the three, had been inoculated with the Small Pox when a year old, and that he had a full burthen, of which his face produced plentiful marks, a circumstance I was not before made acquainted with. On the sixth day the arm of this boy appeared as if inoculated with variolous matter, but the pustule was rather more elevated. On the ninth day he complained of violent pain in his head and back, accompanied with vomiting and much fever. The next day he was very well, and went to work as usual. The punctured part began to spread, and there was the areola around the inoculated part to a considerable extent.

" As this is contrary to an assertion made in the Medical and Physical

Phyſical Journal, No. 8, I thought it right to give you this information, and remain,

" Dear Sir, &c.

" J. Fewster."

It appears then that the animal economy, with regard to the action of this virus, is under the ſame laws as it is with reſpect to the variolous virus, after previouſly feeling its influence, as far as compariſons can be made between the two diſeaſes.

Some ſtriking inſtances of the power of the Cow Pox in ſuſpending the progreſs of the Small Pox, after the patients had been ſeveral days caſually expoſed to the infection, have been laid before me by Mr. Lyford, Surgeon, of Wincheſter, and my nephew, the Rev. G. C. Jenner. Mr. Lyford, after giving an account of his extenſive and ſucceſsful practice in the vaccine inoculation in Hampſhire, writes as follows:

" The following Caſe occurred to me a ſhort time ſince, and may

may probably be worth your notice. I was ſent for to a patient with the Small Pox, and on inquiry found that, five days previous to my ſeeing him, the eruption began to appear. During the whole of this time, two children, who had not had the Small Pox, were conſtantly in the room with their father, and frequently on the bed with him. The mother conſulted me on the propriety of inoculating them, but objected to my taking the matter from their father, as he was ſubject to eryſipelas. I adviſed her by all means to have them inoculated at that time, as I could not procure any variolous matter elſewhere. However, they were inoculated with vaccine matter; but I cannot ſay I flattered myſelf with its proving ſucceſsful, as they had previouſly been ſo long, and ſtill continued to be, expoſed to the variolous infection. Notwithſtanding this, I was agreeably ſurpriſed to find the vaccine diſeaſe advance and go through its regular courſe; and, if I may be allowed the expreſſion, to the total extinction of the Small Pox."

Mr. Jenner's Caſes were not leſs ſatisfactory. He writes as follows:

"A ſon

" A ſon of Thomas Stinchcomb, of Woodford, near Berkeley, was infected with the natural Small Pox at Briſtol, and came home to his father's cottage. Four days after the eruptions had appeared upon the boy, the family (none of which had ever had the Small Pox), conſiſting of the father, mother, and five children, were inoculated with vaccine virus. On the arm of the mother it failed to produce the leaſt effect, and ſhe of courſe had the Small Pox*; but the reſt of the family had the Cow Pox in the uſual mild way, and were not affected with the Small Pox, although they were in the ſame room, and the children ſlept in the ſame bed with their brother, who was confined to it with the natural Small Pox; and ſubſequently with their mother.

" I attended this family with my brother, Mr. H. Jenner."

The following caſes are of too ſingular a nature to remain unnoticed.

* Under ſimilar circumſtances, I think it would be adviſeable to inſert the matter into each arm, which would be more likely to inſure the ſucceſs of the matter. E. J.

Miſs R——, a young lady about five years old, was ſeized, on the evening of the eighth day after inoculation with vaccine virus, with ſuch ſymptoms as commonly denote the acceſſion of violent fever. Her throat was alſo a little ſore, and there were ſome uneaſy ſenſations about the muſcles of the neck. The day following a raſh was perceptible on her face and neck, ſo much reſembling the efflореſcence of the *Scarlatina Anginoſa*, that I was induced to aſk whether Miſs R—— had been expoſed to the contagion of that diſeaſe. An anſwer in the affirmative, and the rapid ſpreading of the redneſs over the ſkin, at once relieved me from much anxiety reſpecting the nature of the malady, which went through its courſe in the ordinary way, but not without ſymptoms which were alarming, both to myſelf and Mr. Lyford, who attended with me. There was no apparent deviation in the ordinary progreſs of the puſtule to a ſtate of maturity, from what we ſee in general; yet there was a total ſuſpenſion of the *Areola*, or florid diſcolouration around it, until the *Scarlatina* had retired from the conſtitution.

ſtitution. As ſoon as the patient was freed from this diſeaſe, this appearance advanced in the uſual way *.

The Caſe of Miſs H—— R——· is not leſs intereſting than that of her ſiſter above related. She was expoſed to the contagion of the *Scarlatina* at the ſame time, and ſickened almoſt at the ſame hour. The ſymptoms continued ſevere about twelve hours, when the Scarlatine raſh ſhewed itſelf faintly upon her face, and partly upon her neck. After remaining two or three hours it ſuddenly diſappeared, and ſhe became perfectly free from every complaint. My ſurpriſe at this ſudden tranſition from extreme ſickneſs to health, in great meaſure ceaſed, when I obſerved that the inoculated puſtule had occaſioned, in this caſe, the common efflorescent appearance around it, and that as it approached the centre, it was nearly in an eryſipelatous

* I witneſſed a ſimilar fact in a caſe of Meaſles†. The puſtule from the Cow-pock virus advanced to maturity, while the Meaſles exiſted in the conſtitution, but no *efflorescence* appeared around it until the Meaſles had ceaſed to exert its influence.

† See page 155.

ſtate. But the moſt remarkable part of this hiſtory is, that on the fourth day afterwards, as ſoon as the efflorescence began to die away upon the arm, and the puſtule to dry up, the *Scarlatina* again appeared, her throat became ſore, the raſh ſpread all over her. She went fairly through the diſeaſe, with its common ſymptoms.

That theſe were actually Caſes of *Scarlatina*, was rendered certain by two ſervants in the family falling ill at the ſame time with the diſtemper, who had been expoſed to the infection with the young ladies.

Some there are who ſuppoſe the ſecurity from the Small Pox obtained through the Cow Pox will be of a temporary nature only. This ſuppoſition is refuted, not only by analogy with reſpect to the habits of diſeaſes of a ſimilar nature, but by incontrovertible facts, which appear in great numbers againſt it. To thoſe already adduced in the former part of my firſt Treatiſe*,

* See pages 9, 11, 12, 13, 14, 20, &c.

many

many more might be added were it deemed neceſſary; but among the Caſes I refer to, one will be found of a perſon who had the Cow Pox fifty-three years before the effect of the Small Pox was tried upon him. As he completely reſiſted it, the intervening period I conceive muſt neceſſarily ſatisfy any reaſonable mind. Should further evidence be thought neceſſary, I ſhall obſerve, that among the Caſes preſented to me by Mr. Fry, Mr. Darke, Mr. Tierny, Mr. H. Jenner, and others, there were many whom they inoculated ineffectually with variolous matter, who had gone through the Cow Pox many years before this trial was made.

It has been imagined that the Cow Pox is capable of being communicated from one perſon to another by effluvia without the intervention of inoculation. My experiments, made with the deſign of aſcertaining this important point, all tend to eſtabliſh my original poſition, that it is not infectious, except by contact. I have never heſitated to ſuffer thoſe, on whoſe arms there were puſtules exhaling the effluvia, from aſſociating or even ſleeping with others who never had experienced either the Cow

Pox

Pox or the Small Pox. And further, I have repeatedly, among children, cauſed the uninfected to breathe over the inoculated vaccine puſtules during their whole progreſs; yet theſe experiments were tried without the leaſt effect. However, to ſubmit a matter ſo important to a ſtill further ſcrutiny, I deſired Mr. H. Jenner to make any further experiments which might ſtrike him as moſt likely to eſtabliſh or refute what had been advanced on this ſubject. He has ſince informed me, "that the inoculated children at the breaſt, whoſe mothers had not gone through either the Small Pox or the Cow Pox; that he had inoculated mothers whoſe ſucking infants had never undergone either of theſe diſeaſes; that the effluvia from the inoculated puſtules, in either caſe, had been inhaled from day to day during the whole progreſs of their maturation, and that there was not the leaſt perceptible effect from theſe expoſures. One woman he inoculated about a week previous to her *accouchement*, that her infant might be the more fully and conveniently expoſed to the puſtule; but, as in the former inſtances, no infection was given, although the child frequently ſlept on the arm of its mother, with its noſtrils and mouth expoſed to the puſtule in the

fulleſt

fulleſt ſtate of maturity. In a word, is it not impoſſible for the Cow Pox, whoſe *only* manifeſtation appears to conſiſt in the puſtules *created by contact*, to produce *itſelf* by effluvia?

In the courſe of a late inoculation, I obſerved an appearance which it may be proper here to relate. The punctured part on a boy's arm (who was inoculated with freſh limpid virus) on the ſixth day, inſtead of ſhewing a beginning veſicle, which is uſual in the Cow Pox at that period, was encruſted over with a rugged amber-coloured ſcab. The ſcab continued to ſpread and increaſe in thickneſs for ſome days, when at its edges a veſicated ring appeared, and the diſeaſe went through its ordinary courſe, the boy having had ſoreneſs in the axilla, and ſome ſlight indiſpoſition. With the fluid matter taken from his arm, five perſons were inoculated. In one it took no effect. In another it produced a perfect puſtule without any deviation from the common appearance; but in the other three the progreſs of the inflammation was exactly ſimilar to the inſtance which afforded the virus for their inoculation; there was a creeping ſcab of a looſe texture, and ſubſequently the formation

formation of limpid fluid at its edges. As theſe people were all employed in laborious exerciſes, it is poſſible that theſe anomalous appearances might owe their origin to the friction of the clothes on the newly-inflamed part of the arm. I have not yet had an opportunity of expoſing them to the Small Pox.

In the early part of this Inquiry I felt far more anxious reſpecting the inflammation of the inoculated arm than at preſent; yet that this affection will go on to a greater extent than could be wiſhed, is a circumſtance ſometimes to be expected. As this can be checked, or even entirely ſubdued by very ſimple means, I ſee no reaſon why the patient ſhould feel an uneaſy hour, becauſe an application may not be abſolutely neceſſary. About the tenth or eleventh day, if the puſtule has proceeded regularly, the appearance of the arm will almoſt to a certainty indicate whether this is to be expected or not. Should it happen, nothing more need be done than to apply a ſingle drop of the *Aqua Lythargyr. Acetati* * upon the puſtule, and having ſuffered it to remain two or three minutes, to cover the efflorеſcence

* Extract of Saturn.

ſurrounding

ſurrounding the puſtule with a piece of linen dipped in the *Aqua Lythargyr. Compos.* * The former may be repeated twice or thrice during the day; the latter as often as it may feel agreeable to the patient.

When the ſcab is prematurely rubbed off, (a circumſtance not unfrequent among children and working people,) the application of a little *Aqua Lythargyri Acet.* to the part, immediately coagulates the ſurface, which ſupplies its place, and prevents a ſore.

In my former Treatiſes on this ſubject, I have remarked that the human conſtitution frequently retains its ſuſceptibility of the Small-pox contagion (both from effluvia and contact) after previouſly feeling its influence. In further corroboration of this declaration, many facts have been communicated to me by various correſpondents. I ſhall ſelect one of them.

* Goulard Water. For further information on this ſubject, ſee the firſt Treatiſe on the Var. Vac. Dr. Marſhall's Letters, &c.

" Dear Sir,

" Society at large muſt I think feel much indebted to you for your Inquiries and Obſervations on the Nature and Effects of the Variolæ Vaccinæ, &c. &c. As I conceive what I am now about to communicate to be of ſome importance, I imagine it cannot be unintereſting to you, eſpecially as it will ſerve to corroborate your aſſertion of the ſuſceptibility of the human ſyſtem of the variolous contagion, although it has previouſly been made ſenſible of its action. In November 1793, I was deſired to inoculate a perſon with the Small Pox. I took the variolous matter from a child under the diſeaſe in the natural way, who had a large burden of diſtinct puſtules. The mother of the child being deſirous of ſeeing my method of communicating the diſeaſe by inoculation, after having opened a puſtule, I introduced the point of my lancet in the uſual way on the back part of my own hand, and thought no more of it until I felt a ſenſation in the part, which reminded me of the tranſaction. This happened upon the third day; on the fourth there

were

were all the appearances common to inoculation, at which I was not at all ſurpriſed; nor did I feel myſelf uneaſy, upon perceiving the inflammation continue to increaſe to the ſixth and ſeventh day, accompanied with a very ſmall quantity of fluid, repeated experiments having taught me it might happen ſo with perſons who had undergone the diſeaſe, and yet would eſcape any conſtitutional affection: but I was not ſo fortunate; for on the eighth day I was ſeized with all the ſymptoms of the eruptive fever, but in a much more violent degree than when I was before inoculated, which was about eighteen years previous to this, when I had a conſiderable number of puſtules. I muſt confeſs I was now greatly alarmed, although I had been much engaged in the Small Pox, having at different times inoculated not leſs than two thouſand perſons. I was convinced my preſent indiſpoſition proceeded from the inſertion of the variolous matter, and therefore anxiouſly looked for an eruption. On the tenth day I felt a very unpleaſant ſenſation of ſtiffneſs, and heat on each ſide of my face near my ear, and the fever began to decline. The affection in my face ſoon terminated in three or four

puſtules

puſtules attended with inflammation, but which did not matu-rate, and I was preſently well.

" I remain, Dear Sir, &c.

" THOMAS MILES."

This Inquiry is not now ſo much in its infancy as to reſtrain me from ſpeaking more poſitively than formerly on the import-ant point of Scrophula, as connected with the Small Pox.

Every practitioner in medicine, who has extenſively inocu-lated with the Small Pox, or has attended many of thoſe who have had the diſtemper in the natural way, muſt acknowledge that he has frequently ſeen ſcrophulous affections, in ſome form or another, ſometimes rather quickly ſhewing themſelves after the recovery of the patients. Conceiving this fact to be admit-ted, as I preſume it muſt be by all who have carefully attended to the ſubject, may I not aſk whether it does not appear probable

probable that the general introduction of the Small Pox into Europe has not been among the moſt conducive means in exciting that formidable foe to health? Having attentively watched the effects of the Cow Pox in this reſpect, I am happy in being able to declare, that the diſeaſe does not appear to have the leaſt tendency to produce this deſtructive malady.

The ſcepticiſm that appeared even among the moſt enlightened of medical men, when my ſentiments on the important ſubject of the Cow Pox were firſt promulgated, was highly laudable. To have admitted the truth of a doctrine, at once ſo novel and ſo unlike any thing that had ever appeared in the Annals of Medicine, without the teſt of the moſt rigid ſcrutiny, would have bordered upon temerity; but now, when that ſcrutiny has taken place, not only among ourſelves, but in the firſt profeſſional circles in Europe, and when it has been uniformly found in ſuch abundant inſtances, that the human frame, when once it has felt the influence of the genuine Cow Pox in the way that has been deſcribed, is never afterwards, at any period of its exiſtence, aſſailable by the Small Pox, may I not with perfect confidence

congratulate

congratulate my country and ſociety at large on their beholding, in the mild form of the Cow Pox, an antidote that is capable of extirpating from the earth a diſeaſe which is every hour devouring its victims; a diſeaſe that has ever been conſidered as the ſevereſt ſcourge of the human race!

FINIS.

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